NEW

# Turbo C®

## Turbo C: The fastest, most efficient and easy-to-use C compiler at any price

*Compilation speed is more than 7000 lines a minute, which makes anything less than Turbo C an exercise in slow motion. Expect what only Borland delivers: Quality, Speed, Power and Price.*

## Turbo C: The C compiler for amateurs and professionals

*If you're just beginning and you've "kinda wanted to learn C," now's your chance to do it the easy way. Like Turbo Pascal, Turbo C's got everything to get you going.*

*If you're already programming in C, switching to Turbo C will considerably increase your productivity and help make your programs both smaller and faster. Actually, writing in Turbo C is a highly productive and effective method—and we speak from experience. Eureka: The Solver and our new generation of software have been developed using Turbo C.*

## Turbo C: a complete interactive development environment

**Free MicroCalc spreadsheet with source code**

*Like Turbo Pascal and Turbo Prolog, Turbo C comes with an interactive editor that will show you syntax errors right in your source code. Developing, debugging, and running a Turbo C program is a snap.*

## Turbo C: The C compiler everybody's been waiting for. Everybody but the competition

*Borland's "Quality, Speed, Power and Price" commitment isn't idle corporate chatter. The $99.95 price tag on Turbo C isn't a "typo," it's real. So if you'd like to learn C in a hurry, pick up the phone. If you're already using C, switch to Turbo C and see the difference for yourself.*

**System requirements**

*IBM PC, XT, AT and true compatibles. PC-DOS (MS-DOS) 2.0 or later. One floppy drive. 320K.*

## Technical Specifications

- ☑ *Compiler: One-pass compiler generating linkable object modules and inline assembler. Included is Borland's high performance "Turbo Linker." The object module is compatible with the PC-DOS linker. Supports tiny, small, compact, medium, large, and huge memory model libraries. Can mix models with near and far pointers. Includes floating point emulator (utilizes 8087/80287 if installed).*
- ☑ *Interactive Editor: The system includes a powerful, interactive full-screen text editor. If the compiler detects an error, the editor automatically positions the cursor appropriately in the source code.*
- ☑ *Development Environment: A powerful "Make" is included so that managing Turbo C program development is highly efficient. Also includes pull-down menus and windows.*
- ☑ *Links with relocatable object modules created using Borland's Turbo Prolog into a single program.*
- ☑ *ANSI C compatible.*
- ☑ *Start-up routine source code included.*
- ☑ *Both command line and integrated environment versions included.*

*Introductory price—good through July 1, 1987

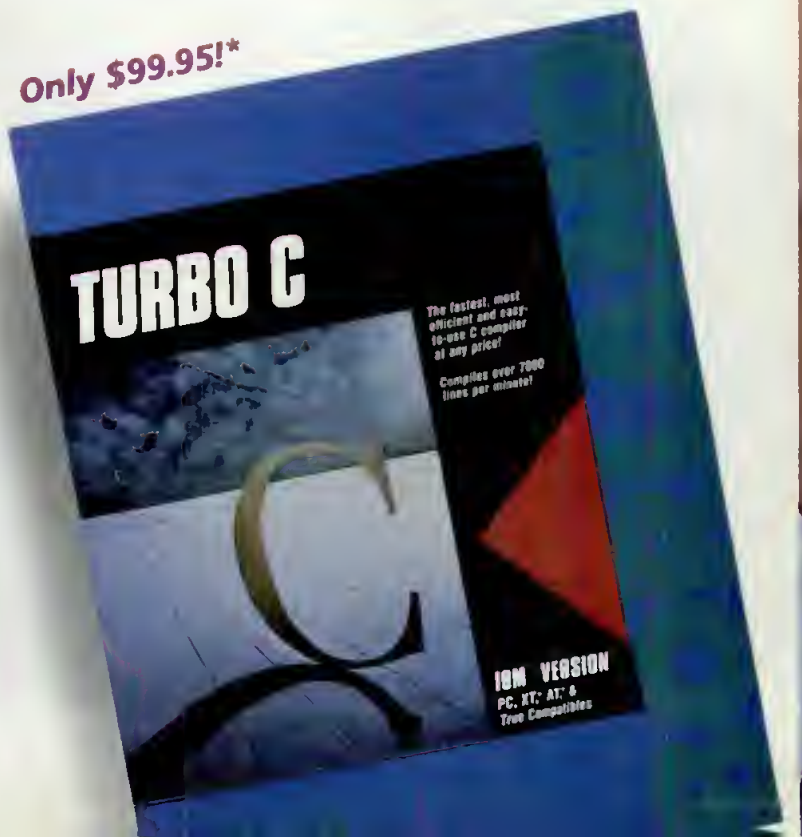
**Sieve benchmark (25 iterations)**

| | Turbo C | Microsoft® C | Lattice C |
|---|---|---|---|
| Compile time | 3.89 | 16.37 | 13.90 |
| Compile and link time | 9.94 | 29.06 | 27.79 |
| Execution time | 5.77 | 9.51 | 13.79 |
| Object code size | 274 | 297 | 301 |
| Price | $99.95 | $450.00 | $500.00 |

*Benchmark run on a 6 Mhz IBM AT using Turbo C version 1.0 and the Turbo Linker version 1.0, Microsoft C version 4.0 and the MS overlay linker version 3.51, Lattice C version 3.1 and the MS object linker version 3.05*

*All Borland products are trademarks or registered trademarks of Borland International, Inc. or Borland/Analytica, Inc. Other brand and product names are trademarks or registered trademarks of their respective holders. Copyright 1987 Borland International BI-1103*

Only $99.95!*




**For the dealer nearest you, or to order by phone**

**call (800) 255-8008**

**CA (800) 742-1133**

**Canada (800) 237-1136**

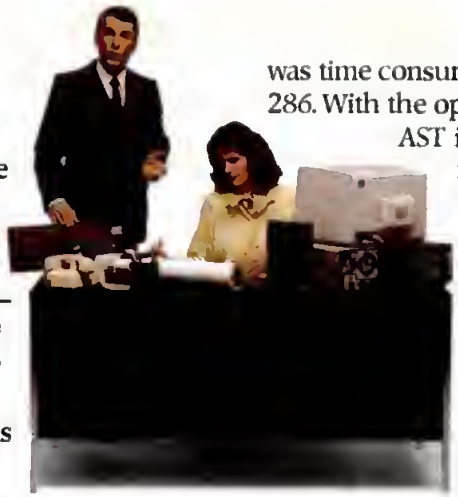
**"Rampage' 286 Offers Up To 2 Megabytes Of Memory For Our ATs and XT 286s.**

Linda's job requires her to be a jack of all trades...accountant, writer, even market researcher.

To get the job done she uses specialized software applications—1-2-3® for spreadsheets, WordStar® for writing and dBASE III® for her extensive database files.

Moving between applications was time consuming until Linda got AST's Rampage 286. With the operating environment software AST includes with all its expanded memory boards, she's able to load her applications directly into RAM once in the morning.

Now she jumps from application to application with the touch of a key. And she can even do several tasks, using multiple applications, at the same time. Rampage 286 was the right choice for Linda."



# "We Needed Versati Solutio

**"Advantage Premium* For A Combination Of I/O Ports and Expanded Memory.**

Bill is setting up his new AT with a modem to send and receive information, a plotter to plot and analyze data, and a letter-quality printer for reports and letters.

We knew he'd need extra ports. So we ordered his AT with AST's Advantage Premium. It offers the same expanded memory features of the Rampage 286, combined with one or two serial ports and a parallel port—all in a single slot.

With 2 Mb of expanded memory, Bill intends to set up large RAM disks and print buffers.

Advantage Premium gives AT users, like Bill, all the power and flexibility they need. Maybe that's why PC Magazine selected it as Editor's Choice for AT multi-function boards."*

# le AT® Memory ns. We Chose AST."

**"For Business Graphics...Rampage/EGA Is The Right Single-Slot Memory/EGA Solution.**

In accounting, Rick, uses EGA-color graphics to convert data into charts and graphs. These images help him to quickly analyze and understand the mountains of data his department acquires. He's found that EGA offers the sharpest, clearest images.

Rick also creates big spreadsheets using the expanded memory version of Lotus* 1-2-3. And here Rampage/EGA's 2 MB of expanded memory can come in mighty handy.

When we added EGA capability to other ATs, Rick recommended AST's Rampage/EGA. He said it works with popular monochrome, color and enhanced color monitors and makes upgrading a system easy. We took his advice. Now Rick is the Accounting Manager."

Lotus Metro™

**"Extended Memory Is Supported, Too!**

We use extended memory for large RAM disks and print buffers. And it's compatible with current and future protected mode operating systems, like XENIX.*"

**"Now Get A Special Offer On Lotus Metro!**

Buy an AST Premium Series Board before June 30th and get a special offer on your purchase of Metro. Metro is a memory-resident, desktop-management program with 12 accessories and a macro generator. It's designed to help you save time by providing greater access to the power of your PC!"

**To Learn More Call (714) 863-1480.** Or send the coupon to AST at the address below.

*AST markets products worldwide – in Europe call 441 568 4550; in the Far East call 852 0499 9113; in Canada call 416 826 7514. AST, the AST logo, Rampage and SixPakPlus registered trademarks and Premium Series and SixPakPremium trademarks of AST Research, Inc. Lotus and 1-2-3 registered and Metro trademarks of Lotus Development Corp. dBASE III registered trademark of Ashton-Tate. WordStar registered trademark of MicroPro International. Copyright © 1986 AST Research, Inc. All rights reserved.*

*PC Magazine Editor's Choice for AT Multifunction Board – January 1987

Yes, send me information on AST's Premium Series boards for the AT!

Name

Title

Address

City/State/Zip

Telephone ( )

Send to: AST Research, Inc., 2121 Alton Ave., Irvine, CA, 92714-4992, Attn: MC

**5/12/87**

AST RESEARCH INC.

## BOB WALLACE
### PC-WRITE 2.7

Author Wallace started his company Quicksoft in 1983. Today, it is one of the most successful shareware software companies around. PC-Write 2.7 is one of the most advanced word processors available as shareware. Major features include:

Mail Merge, Spelling Checker, Proportional spacing, Microspace justify, Index creation and many customizing options.

Try PC-Write and if you decide to use it, register with Quicksoft for the latest version, 360 page manual, two updates and phone support plus a newsletter for one year.


- ☐ 78,627 PC-WRITE VERSION 2.7/4 ..... $12
- ☐ 5 PC-FILE III Version 4, an excellent database manager for labels, inventory, and form letters .... $6
- ☐ 212,334,621,622 RBBS VERSION 14.1a Set up a bulletin board for your local area ..... $24
- ☐ 273 BEST UTILITIES — A collection of our most powerful and useful utilities ..... $6
- ☐ 310 QMODEM COMMUNICATIONS — Send letters or programs to your friends or business constituents $6
- ☐ 403 COMPUTER TUTOR — Learn to use your computer, great for new users ..... $6
- ☐ 405 DESKTEAM — A memory resident calculator, calendar, printer utility, phone dialer, and other desk organizational tools ..... $6
- ☐ 457 ARCADE GAMES Shoot 'em up, Spacewars, Helicopter rescues and more ..... $6
- ☐ 478 HARD DISK UTILITIES — Some of the most useful utilities for the hard disk user ..... $6
- ☐ 608 AUTOMENU — Create professional menus, without all the hassle ..... $6
- ☐ 610 PACKDISK — Optimize and speed up your disk access time ..... $6
- ☐ 613 MANAGING MONEY Many useful programs for making the most of your money ..... $6
- ☐ 614 NEW YORK ADVENTURE — You're trapped in a New York Ghetto, can you escape? ..... $6
- ☐ 90,594 GENEALOGY ON DISPLAY v4.0 Family tree with helpful hints to simplify program use ..... $12

- ☐ PC-SIG LIBRARY ON CD ROM ..... $195.00
- ☐ NEW 1987 PC-SIG DIRECTORY ..... $ 12.95
- ☐ 1 YEAR PC-SIG MEMBERSHIP ..... $ 20.00
  ($36 Foreign) (Includes directory, bimonthly magazine and more)

**SPECIAL**
**Any 5 Disks *plus***
**1-Year Membership**
**Only $39** (Include $4 shipping & handling)

*Most programs have documentation on disk and request a donation from satisfied users. Please add $4 postage and handling per order ($10 foreign) — California residents add*



PC MAGAZINE

PUBLISHER ..... William Lohse

EDITOR ..... Bill Machrone

EXECUTIVE EDITORS ..... Bill Howard, Luisa Simone, Paul Somerson

WEST COAST EDITOR ..... Jared Taylor
SENIOR EDITOR ..... Gus Venditto
TECHNICAL EDITOR ..... Craig L. Stark
ASSISTANT MANAGING EDITORS ..... Greg Pastrick, Paul B. Ross
MANAGER, COPY EDIT ..... Linda Louk
ASSOCIATE EDITORS ..... Carol Ellison, Nora Georgas, Cheryl J. Goldberg
PRODUCTION EDITOR ..... Diane D'Angelo
ASSISTANT EDITORS ..... Michael Cohn, Victoria Danoff, Carole Goldstein, Mitt Jones, Jonathan Matzkin, Catherine D. Miller, Paul V. Olowacz, Ann Ovodow
SENIOR EDITORIAL ASSISTANT ..... M. Stephanie Ricks
EDITORIAL ASSISTANTS ..... Robert Barnett, Peggy Gavan, Christina Okang, Joseph R. Polidoro, Donald P. Willmott, Jennifer Zanto
BUSINESS MANAGER ..... Iris Knittel
PROOFREADERS ..... Meakin David Armstrong, Michael W. Muchmore
RECEPTIONIST ..... Iris Lubar
CONTRIBUTING EDITORS ..... Richard Aarons, Stewart Alsop, Frank J. Derfler, Jr., John Dickinson, John C. Dvorak, Glenn Hart, Steve Holzner, Stephen Manes, Michael J. Mefford, Peter Norton, Barry Owen, Charles Petzold, Winn L. Rosch, Jim Seymour, M. David Stone, Jared Taylor
ASSISTANT TO THE EDITOR ..... David Baker

SENIOR ART DIRECTOR ..... Mary Zisk
TECHNICAL ART DIRECTOR ..... Gerard Kunkel
ASSOCIATE ART DIRECTOR ..... Denise Platkin
ART EDITOR ..... Mariano Nicieza
GRAPHIC DESIGNER ..... Laurie Wance
ASSISTANT ART DIRECTOR ..... Natalie Chu
LAYOUT ARTIST ..... Susan McGuire
GRAPHIC ARTIST ..... Joe Southard
ADMINISTRATIVE ASSISTANT ..... Frieda T. Smallwood

DIRECTOR, PC LABS ..... William G. Wong
TECHNICAL SUPPORT SPECIALIST ..... Charles Rodriguez
LAB SERVICES MANAGER ..... Colleen M. Smith
PROJECT LEADERS ..... Joe Desposito, Bill O'Brien, Philip F.H. Rose
INVENTORY CONTROL TECHNICIAN ..... Leon Newman
RECEPTIONIST ..... David Rivera

MARKETING DIRECTOR ..... Ronni Sonnenberg

PUBLIC RELATIONS MANAGER ..... Jessica Kersey

SINGLE COPY SALES DIRECTOR ..... Bob Woltersdorf
RETAIL SALES & MARKETING MANAGER ..... Carol Benedetto
CIRCULATION MANAGER ..... Charles Mast
CIRCULATION COORDINATOR ..... Robert Smahl

ASSISTANT PRODUCTION DIRECTORS ..... Dorothy Chiffriller, Carlos Lugo
SENIOR AD PRODUCTION MANAGER ..... Susan DePiero
AD PRODUCTION MANAGER ..... Wendy Goldstein
AD PRODUCTION ASSISTANTS ..... Susan Lyon, Lisa Saladino
EDITORIAL PRODUCTION COORDINATORS ..... Eve Hinderer, Barbara Ross
PRODUCTION SYSTEMS ..... Melvin Foster-Poetsch, Linda Harms, Peggy Pennella

ADVERTISING OFFICE ..... One Park Avenue, New York, NY 10016, (212) 503-5100

**ZIFF-DAVIS PUBLISHING COMPANY**

PRESIDENT ..... Kenneth H. Koppel
SENIOR VICE PRESIDENT, MARKETING ..... Paul Chook
VICE PRESIDENT, OPERATIONS ..... Baird Davis
VICE PRESIDENT, CONTROLLER ..... John Vlachos
VICE PRESIDENT, CREATIVE SERVICES ..... Herbert Stern
VICE PRESIDENT, CIRCULATION ..... Alicia Marie Ivans
VICE PRESIDENT, CIRCULATION SERVICES ..... James Ramaley
VICE PRESIDENT, MARKETING SERVICES ..... Ann Pollak Adelman
VICE PRESIDENT, DEVELOPMENT ..... Seth Alpert
VICE PRESIDENT ..... Hugh Tietjen
BUSINESS MANAGER ..... Gary A. Gustafson
PRODUCTION DIRECTOR ..... Walter J. Terlecki

# THANKS FOR THE MEMORIES

Have you ever noticed how time seems to change everything? Fashions change. Technology changes. Even the microcomputers we use change. Maybe that's why so many of our customers are saying goodbye to IBM in favor of a "good buy" from Wells American.

As time goes by, more and more computer users are realizing what an extraordinary value our A★Star II® truly is. It's the *only* AT class microcomputer that can run at 6, 8, 10 *and* 12 MHz! It's also the on*l*y PC/AT compatible that's "network ready." Better yet, each A★Star II now comes with your choice of keyboards - the original AT version or the enhanced "RT" style. Best of all, A★Star II prices start at only $995!

But what about quality and support? Don't worry! We've been making microcomputers *longer* than IBM! And it shows. Our A★Star® computers have been top rated by leading industry trade journals. Even so, we've heard that some "big blue" old-timers still worry about trading their IBM "security" blanket for better priced, higher performance equipment. (Remember how difficult it was to give up *your* baby blanket?) That's why we've arranged for RCA, one of the world's largest technical service organizations with 18,000 employees, to provide low cost, nationwide maintenance for our A★Star II. And if that's not enough, every unit includes free schematics and a no risk money-back guarantee.

**THE A★STAR II IS MADE IN THE USA.**

Still need a blanket? We've got you covered! Try out one of our A★Star II's and we'll send you one. It's baby blue, monogrammed and...it's absolutely free! We'll also include a $395 option, at no charge, with your first A★Star II purchase. This offer *is* limited, so call or write us today. Just because you'll be saying goodbye to IBM doesn't mean you'll have to say goodbye to quality, support or security. Besides, at least you'll still have your memories...and your money!

**Wells American.**

CIRCLE 515 ON READER SERVICE CARD

Corporate Headquarters: 3243 Sunset Boulevard • West Columbia, South Carolina 29169 • 803/796-7800 • TWX 510-601-2645

IBM Personal Computer AT and AT are trademarks of International Business Machines

PC MAGAZINE

COVER STORY


**HARDWARE**

**Plugging into PC Communications**
This special issue of *PC Magazine* is designed to help you with all the decisions you have to make in order to use your PC as an effective communications tool. Modems, on-line databases, electronic mail, innovative communications software—we've sought out the newest and the best in all these categories to point you in the right direction ..... 98

**The Modern Modem: Bridge to the On-line World**
*Winn L. Rosch*/You can't communicate any farther than your desk without a modem, but how can you tell which one of the dozens of available models is right for your needs? We've gathered 87 1,200- and 2,400-bit-per-second modems, subjected them to an extensive series of benchmark tests, and given each modem its own review, focusing on features and ease of use ..... 100
- Reviews ..... 118
- Benchmark tests ..... 182

Measuring 5 by 2½ inches, the Migent Pocket Modem is the smallest one around, page 118

**SERVICES**

**Tapping into On-line Knowledge**
On-line databases can turn your PC into an encyclopedia, a stock ticker, a news wire, a classified page, or even a meeting hall. In "On-line Databases: Dialing for Data," you'll find reviews of 12 of the best-known databases. Making your way through the reams of information on them may require a little help from a search program to find the item you need. These programs, which are evaluated in "Search Software: Directory Assistance," will show you the way ..... 237
- **On-line Databases: Dialing for Data**
*Tom Badgett* ..... 238
- **Search Software: Directory Assistance**
*Tom Badgett* ..... 263

**Wired to the World**
Long-time public-electronic-mail leaders EasyLink and MCI Mail are being challenged by a newcomer with a familiar first name: AT&T Mail. Is it time to reevaluate the service you currently use? Find out in "Public E-Mail: Person-to-Person." Meanwhile, corporations with widely scattered offices have special electronic-mail needs of their own, and a group of custom-designed services has emerged to serve them. Take a look at Notice, Mail, OnTyme, The Quik-Comm System, RCA Mail, and Telemail in "Corporate E-Mail: The Electronic Mailroom" ..... 275
- **Public E-Mail: Person-to-Person**
*Barbara Krasnoff* ..... 276
- **Corporate E-Mail: The Electronic Mailroom**
*Barbara Krasnoff* ..... 295

**SOFTWARE**

**Background Communications: Invisible E-Mail**
*M. David Stone*/If you hate jumping in and out of a communications program every time you want to go on-line, *Relay Silver*, *Relay Gold*, *Alexander-Plus Data II*, *BackComm*, and *SideTalk* will allow you to remain in your current application while you link up ..... 305

# THANKS FOR THE MEMORIES

Have you ever noticed how time seems to change everything? Fashions change. Technology changes. Even the microcomputers we use change. Maybe that's why so many of our customers are saying goodbye to IBM in lavor ol a "good buy" from Wells American.

As time goes by, more and more computer users are realizing what an extraordinary value our A★Star II® truly is. It's the *only* AT class microcomputer that can run at 6, 8, 10 *and* 12 MHz! It's also the *only* PC/AT compatible that's "network ready." Better yet, each A★Star II now comes with your choice of keyboards - the original AT version or the enhanced "RT" style. Best ol all, A★Star II prices start at only $995!

But what about quality and support? Don't worry! We've been making microcomputers *longer* than IBM! And it shows. Our A★Star® computers have been top rated by leading industry trade journals. Even so, we've heard that some "big blue" old-timers still worry about trading their IBM "security" blanket for better priced, higher performance equipment. (Remember how difficult it was to give up *your* baby blanket?) That's why we've arranged for RCA, one of the world's largest technical service organizations with 18,000 employees, to provide low cost, nationwide maintenance for our A★Star II. And il that's not enough, every unit includes free schematics and a no risk money-back guarantee.

**THE A★STAR II IS MADE IN THE USA.**

Still need a blanket? We've got you covered! Try out one of our A★Star II's and we'll send you one. It's baby blue, monogrammed and... it's absolutely free! We'll also include a $395 option, at no charge, with your first A★Star II purchase. This offer *is* limited, so call or write us today. Just because you'll be saying goodbye to IBM doesn't mean you'll have to say goodbye to quality, support or security. Besides, at least you'll still have your memories... and your money!

**Wells American.**

CIRCLE 515 ON READER SERVICE CARD

Corporate Headquarters: 3243 Sunset Boulevard • West Columbia, South Carolina 29169 • 803/796-7800 • TWX 510-601-2645

IBM Personal Computer AT and AT are trademarks of International Business Machines

PC MAGAZINE

Measuring 5 by 2½ inches, the Migent Pocket Modem is the smallest one around, page 118

## COVER STORY

### HARDWARE

**Plugging into PC Communications**

This special issue of *PC Magazine* is designed to help you with all the decisions you have to make in order to use your PC as an effective communications tool. Modems, on-line databases, electronic mail, innovative communications software—we've sought out the newest and the best in all these categories to point you in the right direction ..... 98

**The Modern Modem: Bridge to the On-line World**

*Wim L. Rosch*/You can't communicate any farther than your desk without a modem, but how can you tell which one of the dozens of available models is right for your needs? We've gathered 87 1,200- and 2,400-bit-per-second modems, subjected them to an extensive series of benchmark tests, and given each modem its own review, focusing on features and ease of use ..... 100
• Reviews ..... 118
• Benchmark tests ..... 182

### SERVICES

**Tapping into On-line Knowledge**

On-line databases can turn your PC into an encyclopedia, a stock ticker, a news wire, a classified page, or even a meeting hall. In "On-line Databases: Dialing for Data," you'll find reviews of 12 of the best-known databases. Making your way through the reams of information on them may require a little help from a search program to find the item you need. These programs, which are evaluated in "Search Software: Directory Assistance," will show you the way ..... 237
• **On-line Databases: Dialing for Data**
*Tom Badgett* ..... 238
• **Search Software: Directory Assistance**
*Tom Badgett* ..... 263

**Wired to the World**

Long-time public-electronic-mail leaders EasyLink and MCI Mail are being challenged by a newcomer with a familiar first name: AT&T Mail. Is it time to reevaluate the service you currently use? Find out in "Public E-Mail: Person-to-Person." Meanwhile, corporations with widely scattered offices have special electronic-mail needs of their own, and a group of custom-designed services has emerged to serve them. Take a look at Notice, Mail, OnTyme, The Quik-Comm System, RCA Mail, and Telemail in "Corporate E-Mail: The Electronic Mailroom" ..... 275
• **Public E-Mail: Person-to-Person**
*Barbara Krasnoff* ..... 276
• **Corporate E-Mail: The Electronic Mailroom**
*Barbara Krasnoff* ..... 295

### SOFTWARE

**Background Communications: Invisible E-Mail**

*M. David Stone*/If you hate jumping in and out of a communications program every time you want to go on-line, *Relay Silver*, *Relay Gold*, *Alexander-Plus Data II*, *BackComm*, and *SideTalk* will allow you to remain in your current application while you link up ..... 305

# THE COMPUTER THAT CONQUERED TIME

Finally—a computer that breaks through the barriers of time and space to help you become more *productive.*

The PC's Limited 286[12] runs at a record-setting 12 megahertz, yet it occupies 20% less space than the older, slower "big-name" brand.

Now—can you afford not to be a "power user"?

# WHAT'S INSIDE


## FIRST LOOKS

**Hands On:**
- Microsoft's QuickBASIC
- Turner Hall's *4Word*
- Access Softek's *Dragnet*
- GRiD Systems' GRiDlite
- Paradise Systems' AutoSwitch EGA 480 Card
- WordTech Systems' *dBXL*
- Emerald Systems' Emerald DOS-2010 Cassette Tape Backup.....33

## VIEWPOINTS

**LETTERS TO PC MAGAZINE**.....15

**PC ADVISOR**
*Gus Venditto*/The best hard disk interleave settings .....27

**FROM THE EDITOR'S SCREEN**
*Bill Machrone*/Report from the Front.....59

**JOHN C. DVORAK**
Of Mice and Men.....65
Inside Track.....67

**JIM SEYMOUR**
An End to Doc-Bashing....75

**STEPHEN MANES**
Crossed Wires.....83

**STEWART ALSOP**
Real Expanded Memory ..91

**Direct Marketing**
Connection.....409
Marketplace.....423
Reader Service Card..455
Index to Advertisers...457
**Advertiser's Product Index**.....460
**Editorial Product Index**.....462
Coming Up .....463

## PRODUCTIVITY

**PC LAB NOTES**
**Turbocharging BASIC, Part 1**
*Ethan Winer*/Turbo BASIC's new commands and capabilities soup up a familiar language ..... 331

**PROGRAMMING/UTILITIES**
FREE PROGRAM!
**DRAWing Made Easy**
*Michael J. Mefford*/DRAW lets you create your masterpieces without entering BASIC..... 343

**SPREADSHEET CLINIC**
*Jared Taylor*/Stashing info: printing files in sequence; a caution on copying..... 371

**CONNECTIVITY CLINIC**
*Frank J. Derfler, Jr.*/Bridges between networks; benchmark tests as network specs; high-speed clone servers ..... 377

**TURBO POWER USER**
*Neil J. Rubenking*/Figuring the space left on a floppy disk; I/O to the device you choose; generating BASIC programs from .COM files ..... 385

**USER-TO-USER**
*Paul Somerson*/Making files all caps or lowercase; an extra measure of security; split-second split-screens..... 393

**PC TUTOR**
*Charles Petzold*/Hushing computer beeping; QuickBASIC and the EGA; the PC's unaccommodating eighth slot ..... 403


**Cover Photograph:**
Roberto Brosan

Howard Marks

In the planning stages of *PC Magazine*'s special communications issue, contributing editor Jim Seymour offered an abbreviated buying guide: "Do you want to telecommunicate? If not, close this magazine. If yes, buy a 1,200-bit-per-second Hayes Smartmodem. If you live in an area with a good packet-switching system, buy a Hayes 2400. End of decision tree. Now turn on your computer and do something useful."

While our columnist was joking, he summed up the way most PC users feel about modems: you buy one, you plug it in, it works. If you're buying for your company, you pay the $200 to $300 premium for the Hayes label. If not, you pick one of the cheaper modems, and, if you get excessive data errors, you call again and hope for a cleaner phone line.

With more than a hundred 1,200- and 2,400-bps modems on the market, we wanted to know, as you probably do, too, if there's a reason why Hayes and a handful of others charge twice as much as the competition and still sell them by the carload—or if all modems perform the same. And we wanted to know how well 2,400-bps modems perform on existing lines and if they're worth the extra cost. We bypassed 300-bps modems; you should, too—they're too slow for serious users.

Armed with a pair of TAS telephone line simulators, tester Howard Marks put 87 modems through a battery of PC Labs tests that measured the modems' ability to punch through line noise and deliver error-free data on poor-, average-, and good-quality phone lines. Then we sent the modems to reviewers around the country, where they were subjected to concentrated doses of real-world operation that included being dropped off desks and jammed in subway doors (inadvertently, we hasten to add). The reviewers tested for Hayes compatibility, manufacturing quality, usability, and all the other things to look for in a computer peripheral.

The project yielded some interesting results. For one thing, Hayes and its pricey brethren have to contend with some serious competition from cheaper modems. Lots of modem manufacturers are enticing buyers with extras like built-in error correction and dialing directories. And a cheap 2,400-bps modem might be the best buy of all. Our detailed reviews and benchmark test results begin on page 118.

The modem is the message of this special issue, but we've packed in a lot of other features to get you started in PC communications. Stories on electronic mail, on-line databases, and communications software will give you some ideas for using the modem you buy.

NEW

# Turbo C®

## Turbo C: The fastest, most efficient and easy-to-use C compiler at any price

Compilation speed is more than 7000 lines a minute, which makes anything less than Turbo C an exercise in slow motion. Expect what only Borland delivers: Quality, Speed, Power and Price.

## Turbo C: The C compiler for amateurs and professionals

If you're just beginning and you've "kinda wanted to learn C," now's your chance to do it the easy way. Like Turbo Pascal, Turbo C's got everything to get you going.

If you're already programming in C, switching to Turbo C will considerably increase your productivity and help make your programs both smaller and faster. Actually, writing in Turbo C is a highly productive and effective method—and we speak from experience. Eureka: The Solver and our new generation of software have been developed using Turbo C.

## Turbo C: a complete interactive development environment

**Free MicroCalc spreadsheet with source code**

Like Turbo Pascal and Turbo Prolog, Turbo C comes with an interactive editor that will show you syntax errors right in your source code. Developing, debugging, and running a Turbo C program is a snap.

## Turbo C: The C compiler everybody's been waiting for. Everybody but the competition

Borland's "Quality, Speed, Power and Price" commitment isn't idle corporate chatter. The $99.95 price tag on Turbo C isn't a "typo," it's real. So if you'd like to learn C in a hurry, pick up the phone. If you're already using C, switch to Turbo C and see the difference for yourself.

**System requirements**

IBM PC, XT, AT and true compatibles. PC-DOS (MS-DOS) 2.0 or later. One floppy drive. 320K.

## Technical Specifications

- ☑ Compiler: One-pass compiler generating linkable object modules and inline assembler. Included is Borland's high performance "Turbo Linker." The object module is compatible with the PC-DOS linker. Supports tiny, small, compact, medium, large, and huge memory model libraries. Can mix models with near and far pointers. Includes floating point emulator (utilizes 8087/80287 if installed).
- ☑ Interactive Editor: The system includes a powerful, interactive full-screen text editor. If the compiler detects an error, the editor automatically positions the cursor appropriately in the source code.
- ☑ Development Environment: A powerful "Make" is included so that managing Turbo C program development is highly efficient. Also includes pull-down menus and windows.
- ☑ Links with relocatable object modules created using Borland's Turbo Prolog into a single program.
- ☑ ANSI C compatible.
- ☑ Start-up routine source code included.
- ☑ Both command line and integrated environment versions included.

*Introductory price—good through July 1, 1987

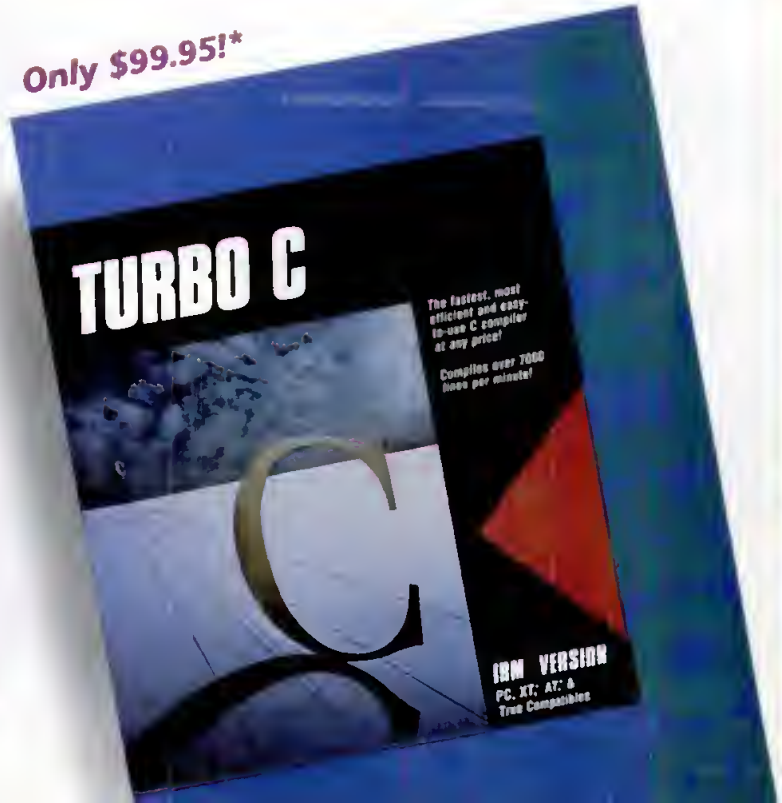
**Sieve benchmark (25 iterations)**

| | Turbo C | Microsoft® C | Lattice C |
|---|---|---|---|
| Compile time | 3.89 | 16.37 | 13.90 |
| Compile and link time | 9.94 | 29.06 | 27.79 |
| Execution time | 5.77 | 9.51 | 13.79 |
| Object code size | 274 | 297 | 301 |
| Price | $99.95 | $450.00 | $500.00 |

Benchmark run on a 6 Mhz IBM AT using Turbo C version 1.0 and the Turbo Linker version 1.0, Microsoft C version 4.0 and the MS overlay linker version 3.51, Lattice C version 3.1 and the MS object linker version 3.05

All Borland products are trademarks or registered trademarks of Borland International, Inc. or Borland/Analytica, Inc. Other brand and product names are trademarks or registered trademarks of their respective holders. Copyright 1987 Borland International BI-1103

Only $99.95!*




For the dealer nearest you, or to order by phone

call (800) 255-8008

CA (800) 742-1133

Canada (800) 237-1136

**"Rampage' 286 Offers Up To 2 Megabytes Of Memory For Our ATs and XT 286s.**

Linda's job requires her to be a jack of all trades...accountant, writer, even market researcher.

To get the job done she uses specialized software applications—1-2-3® for spreadsheets, WordStar® for writing and dBASE III® for her extensive database files.

Moving between applications was time consuming until Linda got AST's Rampage 286. With the operating environment software AST includes with all its expanded memory boards, she's able to load her applications directly into RAM once in the morning.

Now she jumps from application to application with the touch of a key. And she can even do several tasks, using multiple applications, at the same time. Rampage 286 was the right choice for Linda."

# "We Needed Versati Solutio

## BOB WALLACE
### PC-WRITE 2.7

Author Wallace started his company Quicksoft in 1983. Today, it is one of the most successful shareware software companies around. PC-Write 2.7 is one of the most advanced word processors available as shareware. Major features include:

Mail Merge, Spelling Checker, Proportional spacing, Microspace justify, Index creation and many customizing options.

Try PC-Write and if you decide to use it, register with Quicksoft for the latest version, 360 page manual, two updates and phone support plus a newsletter for one year.

- ☐ 78,627 PC-WRITE VERSION 2.7/4 ..... $12
- ☐ 5 PC-FILE III Version 4, an excellent database manager for labels, inventory, and form letters .... $6
- ☐ 212,334,621,622 RBBS VERSION 14 1a Set up a bulletin board for your local area ..... $24
- ☐ 273 BEST UTILITIES — A collection of our most powerful and useful utilities ..... $6
- ☐ 310 QMODEM COMMUNICATIONS — Send letters or programs to your friends or business constituents . $6
- ☐ 403 COMPUTER TUTOR — Learn to use your computer, great for new users ..... $6
- ☐ 405 DESKTEAM — A memory resident calculator, calendar, printer utility, phone dialer, and other desk organizational tools ..... $6
- ☐ 457 ARCADE GAMES Shoot 'em up, Spacewars, Helicopter rescues and more ..... $6
- ☐ 478 HARD DISK UTILITIES — Some of the most useful utilities for the hard disk user ..... $6
- ☐ 608 AUTOMENU — Create professional menus, without all the hassle ..... $6
- ☐ 610 PACKDISK — Optimize and speed up your disk access time ..... $6
- ☐ 613 MANAGING MONEY Many useful programs for making the most of your money ..... $6
- ☐ 614 NEW YORK ADVENTURE — You're trapped in a New York Ghetto, can you escape? ..... $6
- ☐ 90,594 GENEALOGY ON DISPLAY v4 0 Family tree with helpful hints to simplify program use .... $12

- ☐ PC-SIG LIBRARY ON CD ROM ..... $195.00
- ☐ NEW 1987 PC-SIG DIRECTORY ..... $ 12.95
- ☐ 1 YEAR PC-SIG MEMBERSHIP ..... $ 20.00
($36 Foreign) (Includes directory, bimonthly magazine and more )

**SPECIAL**
**Any 5 Disks *plus***
**1-Year Membership**
**Only $39** (Include $4 shipping & handling)

*Most programs have documentation on disk and request a donation from satisfied users. Please add $4 postage and handling per order ($10 foreign) — California residents add state sales tax.*

360

Total Enclosed $_____ by ☐ Check ☐ VISA ☐ MC

Card No. _____

Exp. date_____ Signature_____

Name _____

Address _____

City _____ State_____ Zip_____

PC-SIG

To order, call: **800-245-6717**
In CA: **800-222-2996**
For technical questions or local orders: **(408) 730-9291**

**1030D East Duane Avenue Sunnyvale, CA 94086**

CIRCLE 145 ON READER SERVICE CARD



PC MAGAZINE

| | |
|---|---|
| PUBLISHER | William Lohse |
| EDITOR | Bill Machrone |
| EXECUTIVE EDITORS | Bill Howard, Luisa Simone, Paul Somerson |
| WEST COAST EDITOR | Jared Taylor |
| SENIOR EDITOR | Gus Venditto |
| TECHNICAL EDITOR | Craig L. Stark |
| ASSISTANT MANAGING EDITORS | Greg Pastrick, Paul B. Ross |
| MANAGER, COPY EDIT | Linda Louk |
| ASSOCIATE EDITORS | Carol Ellison, Nora Georgas, Cheryl J. Goldberg |
| PRODUCTION EDITOR | Diane D'Angelo |
| ASSISTANT EDITORS | Michael Cohn, Victoria Danoff, Carole Goldstein, Mitt Jones, Jonathan Matzkin, Catherine D. Miller, Paul V. Olowacz, Ann Ovodow |
| SENIOR EDITORIAL ASSISTANT | M. Stephanie Ricks |
| EDITORIAL ASSISTANTS | Robert Barnett, Peggy Gavan, Christina Okang, Joseph R. Polidoro, Donald P. Willmott, Jennifer Zano |
| BUSINESS MANAGER | Iris Knittel |
| PROOFREADERS | Meakin David Armstrong, Michael W. Muchmore |
| RECEPTIONIST | Iris Lubar |
| CONTRIBUTING EDITORS | Richard Aarons, Stewart Alsop, Frank J. Derfler, Jr., John Dickinson, John C. Dvorak, Glenn Hart, Steve Holzner, Stephen Manes, Michael J. Mefford, Peter Norton, Barry Owen, Charles Petzold, Winn L. Rosch, Jim Seymour, M. David Stone, Jared Taylor |
| ASSISTANT TO THE EDITOR | David Baker |
| SENIOR ART DIRECTOR | Mary Zisk |
| TECHNICAL ART DIRECTOR | Gerard Kunkel |
| ASSOCIATE ART DIRECTOR | Denise Pladkin |
| ART EDITOR | Mariano Nicieza |
| GRAPHIC DESIGNER | Laurie Wance |
| ASSISTANT ART DIRECTOR | Natalie Chu |
| LAYOUT ARTIST | Susan McGuire |
| GRAPHIC ARTIST | Joe Southard |
| ADMINISTRATIVE ASSISTANT | Frieda T. Smallwood |
| DIRECTOR, PC LABS | William G. Wong |
| TECHNICAL SUPPORT SPECIALIST | Charles Rodriguez |
| LAB SERVICES MANAGER | Colleen M. Smith |
| PROJECT LEADERS | Joe Desposito, Bill O'Brien, Philip F.H. Rose |
| INVENTORY CONTROL TECHNICIAN | Leon Newman |
| RECEPTIONIST | David Rivera |
| MARKETING DIRECTOR | Ronni Sonnenberg |
| PUBLIC RELATIONS MANAGER | Jessica Kersey |
| SINGLE COPY SALES DIRECTOR | Bob Woltersdorf |
| RETAIL SALES & MARKETING MANAGER | Carol Benedetto |
| CIRCULATION MANAGER | Charles Mast |
| CIRCULATION COORDINATOR | Robert Smahl |
| ASSISTANT PRODUCTION DIRECTORS | Dorothy Chiffriller, Carlos Lugo |
| SENIOR AD PRODUCTION MANAGER | Susan DePierro |
| AD PRODUCTION MANAGER | Wendy Goldstein |
| AD PRODUCTION ASSISTANTS | Susan Livoti, Lisa Saladino |
| EDITORIAL PRODUCTION COORDINATORS | Eve Hinderer, Barbara Ross |
| PRODUCTION SYSTEMS | Melvin Foster-Poetsch, Linda Harms, Peggy Pennella |
| ADVERTISING OFFICE | One Park Avenue, New York, NY 10016, (212) 503-5100 |

**ZIFF-DAVIS PUBLISHING COMPANY**

| | |
|---|---|
| PRESIDENT | Kenneth H. Koppel |
| SENIOR VICE PRESIDENT, MARKETING | Paul Chook |
| VICE PRESIDENT, OPERATIONS | Baird Davis |
| VICE PRESIDENT, CONTROLLER | John Vlachos |
| VICE PRESIDENT, CREATIVE SERVICES | Herbert Stern |
| VICE PRESIDENT, CIRCULATION | Alicia Marie Ivans |
| VICE PRESIDENT, CIRCULATION SERVICES | James Ramaley |
| VICE PRESIDENT, MARKETING SERVICES | Ann Pollak Adelman |
| VICE PRESIDENT, DEVELOPMENT | Seth Alpert |
| VICE PRESIDENT | Hugh Tietjen |
| BUSINESS MANAGER | Gary A. Gustafson |
| PRODUCTION DIRECTOR | Walter J. Terlecki |

**ZIFF COMMUNICATIONS COMPANY**

**Chairman** Philip B. Korsant **President** Kenneth H. Koppel **Senior Vice President** Philip Sine **Vice Presidents** Laurence Usdin, William Phillips, J. Malcolm Morris, Steven C. Feinman **Treasurer** Selwyn I. Taubman **Secretary** Bertram A. Abrams

*PC Magazine: The Independent Guide to IBM-Standard Personal Computing* ISSN (P0745-2500) is published bi-weekly except in July and August for $34.97 for one year (22 issues). $61.97 for two years, and $81.97 for three years. Additional postage $1.00 per copy or $22.00 per year for Canada and all other foreign countries. Ziff-Davis Publishing Co., a division of Ziff Communications Co., One Park Ave., New York, NY 10016. Second-Class postage paid at New York, NY 10016 and at additional mailing offices. POSTMASTER: Address changes to *PC Magazine*, P.O. Box 54093, Boulder, CO 80321-4093. Editorial and Business Office: One Park Ave., New York, NY 10016. Editorial (212) 503-5255. Advertising (212) 503-5100. For subscription inquiries and service, write to *PC Magazine*, P.O. Box 2445, Boulder, CO 80322, (303) 447-9330. *PC Magazine* is an independent journal, not affiliated in any way with International Business Machines Corporation. IBM is a registered trademark of International Business Machines Corp. Entire contents Copyright © 1986 Ziff-Davis Publishing Co., a division of Ziff Communications Co. All rights reserved; reproduction in whole or in part without permission is prohibited. The following are trademarks of Ziff Communications Co., PC, PC: The Independent Guide to IBM-Standard Personal Computing, PC Magazine, PC Mart, PC Laboratory, PC Lab, PC Labs, PC-Communiqués, Project PC, PC Tutor, PC BlueBook, User-to-User, Power User, Spreadsheet Clinic, The PC Utilities, PC Lab Notes, PC Advisor, First Looks. **Permissions:** Material in this publication may not be reproduced in any form without permission. Requests for permission should be directed to Jean Lamendorf, Ziff-Davis Publishing Company, One Park Ave., New York, NY 10016. **Editorial Communications** may be addressed to MCI Mail 157-9301. **PC Interactive Reader Service:** (212) 696-0360 (Protocol: 8,N,1).

BPA

**"Advantage Premium* For A Combination Of I/O Ports and Expanded Memory.**

Bill is setting up his new AT with a modem to send and receive information, a plotter to plot and analyze data, and a letter-quality printer for reports and letters.

We knew he'd need extra ports. So we ordered his AT with AST's Advantage Premium. It offers the same expanded memory features of the Rampage 286, combined with one or two serial ports and a parallel port—all in a single slot.

With 2 Mb of expanded memory, Bill intends to set up large RAM disks and print buffers.

Advantage Premium gives AT users, like Bill, all the power and flexibility they need. Maybe that's why PC Magazine selected it as Editor's Choice for AT multifunction boards."*

# le AT® Memory ns. We Chose AST."

**"For Business Graphics...Rampage/EGA Is The Right Single-Slot Memory/EGA Solution.**

In accounting, Rick, uses EGA-color graphics to convert data into charts and graphs. These images help him to quickly analyze and understand the mountains of data his department acquires. He's found that EGA offers the sharpest, clearest images.

Rick also creates big spreadsheets using the expanded memory version of Lotus* 1-2-3. And here Rampage/EGA's 2 MB of expanded memory can come in mighty handy.

When we added EGA capability to other ATs, Rick recommended AST's Rampage/EGA. He said it works with popular monochrome, color and enhanced color monitors and makes upgrading a system easy. We took his advice. Now Rick is the Accounting Manager."

Lotus Metro

**"Extended Memory Is Supported, Too!**

We use extended memory for large RAM disks and print buffers. And it's compatible with current and future protected mode operating systems, like XENIX."*

**"Now Get A Special Offer On Lotus Metro!**

Buy an AST Premium Series Board before June 30th and get a special offer on your purchase of Metro. Metro is a memory-resident, desktop-management program with 12 accessories and a macro generator. It's designed to help you save time by providing greater access to the power of your PC!"

**To Learn More Call (714) 863-1480.** Or send the coupon to AST at the address below.

*AST markets products worldwide—in Europe call 441 568 4350; in the far East call 852 0499 9113; in Canada call 416 826 7914. AST, the AST logo, Rampage and SixPakPlus registered trademarks and Premium Series and SixPakPremium trademarks of AST Research, Inc. Lotus and 1-2-3 registered and Metro trademarks of Lotus Development Corp. dBASE III registered trademark of Ashton-Tate. WordStar registered trademark of MicroPro International. Copyright © 1986 AST Research, Inc. All rights reserved.*
*"PC Magazine Editor's Choice for AT Multifunction Board," January 1987.*

Yes, send me information on AST's Premium Series boards for the AT!

Name

Title

Address

City/State/Zip

Telephone ( )

Send to: AST Research, Inc., 2121 Alton Ave., Irvine, CA, 92714-4992, Attn: MC

5/12/87

AST® RESEARCH INC.

# ALSO CONQUERS SPACE.

The 12-megahertz 286[12] and 8-megahertz 286[8] come complete with a 1.2 megabyte floppy disk drive, 1,024K of high-speed RAM, 200-watt power supply and an AT-style keyboard.

Both feature SmartVu™, an alphanumeric LED panel that's a window on your world of computing, a look into the heart of the computer, reporting operating speeds and diagnostic messages in understandable English.

The 286[8] and 286[12] have been created by the best team of computer-hardware designers in the business. A totally new motherboard, custom ROM BIOS and proprietary circuits have been developed for this high-performance computer environment. And *every* 286[8] and 286[12] is bench-tested and run through an extensive burn-in before shipment.

PC's Limited was the first direct-response marketer to offer high-quality, low-priced PC-AT compatibles. PC's Limited has been a leader in pushing high-performance personal computing through price barriers. The experience gained from selling and supporting tens of thousands of high-performance PCs to customers ranging from Fortune 500 companies to solo users has been applied to designing the most advanced personal computers ever produced: the PC's Limited 286[8] and 286[12].

Naturally, the 286[8] and the 286[12] are backed by PC's Limited's One-Year Limited Warranty, and by our 30-day Money Back Guarantee.

Twelve megahertz or eight megahertz... the choice is yours. *In high-performance computing, the choice is clear: PC's Limited.*

**PC'S LIMITED**

SALES CALLS OUTSIDE TEXAS, 1-800-426-5150
SALES CALLS INSIDE TEXAS, 1-800-252-8336
1611 Headway Circle, Building 3, Austin, Texas 78754
Sales Calls from anywhere in the country, (512) 339-6962
Technical Support Calls, 1-(800) 624-9896 or PC's Limited BBS (512) 339-4127
Customer Service Calls, 1-(800) 624-9897 or MCI MAIL: PC's Limited
Telex No. 9103008306 PC LTD FAX (512) 339-6721

**1-800-426-5150**

SmartVu 286[12] and 286[8] are trademarks of PC's Limited

# AND NOW, SYSTEMS THAT

(Space-saving chassis shown here.)

(AT™-standard chassis shown here.)

## CHOOSE FROM THESE GREAT PC'S LIMITED 286 VALUES.

### PC'S LIMITED 286[8]

#### Monochrome Systems

- Intel 80286 running at 8 MHz
- 1024K on Motherboard
- 1.2 Meg Floppy Disk Drive
- Combined Floppy and Hard Disk Controller
- AT™-Style 84-Key Keyboard
- 192 Watt Power Supply
- Clock/Calendar with Battery Backup
- Hercules Compatible Monochrome Graphics Card
- 2 Serials and 2 Parallel Ports
- PC's Limited Mono-IIA Flat Screen Monochrome Monitor with Tilt and Swivel Base
- SmartVu™ (Real Time Diagnostic Display)

with 20 Meg, 65 MS Hard Disk Drive, Space Saving Chassis— $1795

with 30 Meg, 40 MS Hard Disk Drive, AT™ Standard Chassis— $2195

#### EGAds! Color Systems

- Intel 80286 running at 8 MHz
- 1024K on Motherboard
- 1.2 Meg Floppy Disk Drive
- Combined Floppy and Hard Disk Controller
- AT™-Style 84-Key Keyboard
- 192 Watt Power Supply
- Clock/Calendar with Battery Backup
- PC's Limited EGAds! Card
- 2 Serials and 1 Parallel Port
- PC's Limited EGAds! Monitor
- SmartVu™ (Real Time Diagnostic Display)

with 20 Meg, 65 MS Hard Disk Drive, Space Saving Chassis— $2195

with 30 Meg, 40 MS Hard Disk Drive, AT™ Standard Chassis— $2595

### PC'S LIMITED 286[12]

#### Monochrome Systems

- Intel 80286 running at 12 MHz
- 1024K on Motherboard
- 1.2 Megabyte Floppy Disk Drive
- Combined Floppy and Hard Disk Controller
- AT™-Style 84-Key Keyboard
- 192 Watt Power Supply
- Clock/Calendar with Battery Backup
- Hercules Compatible Monochrome Graphics Card
- 2 Serials and 2 Parallel Ports
- PC's Limited Mono-IIA Flat Screen Monochrome Monitor with Tilt and Swivel Base
- AT™-Standard Chassis
- SmartVu™ (Real Time Diagnostic Display)

with 30 Meg, 28 MS Hard Disk Drive— $3095

with 40 Meg, 28 MS Hard Disk Drive— $3295

#### EGAds! Color Systems

- Intel 80286 running at 12 MHz
- 1024K on Motherboard
- 1.2 Megabyte Floppy Disk Drive
- Combined Floppy and Hard Disk Controller
- AT™-Style 84-Key Keyboard
- 192 Watt Power Supply
- Clock/Calendar with Battery Backup
- PC's Limited EGAds! Card
- 2 Serials and 1 Parallel Ports
- PC's Limited EGAds! Monitor
- AT™-Standard Chassis
- SmartVu™ (Real Time Diagnostic Display)

with one 30 Meg, 28 MS Hard Disk Drive— $3495

with one 40 Meg, 28 MS Hard Disk Drive— $3695

# CONQUER THE PRICE BARRIER.

## CHOOSE FROM THESE GREAT PC'S LIMITED TURBO PC™ VALUES.

### PC'S LIMITED TURBO PC™

**Monochrome Systems**

- Intel 16-Bit 8088-2 System Unit running at 4.77 MHz and 8.0 MHz
- 640K on Motherboard
- AT™-Style 84-Key Keyboard
- 130 Watt Power Supply
- Hercules Compatible Graphics Adapter with one Parallel Port
- PC's Limited Mono-IIA Flat Screen Monochrome Monitor with Tilt and Swivel Base

with two 360K Floppy Disk Drives— $859

with one 360K Floppy Disk Drive and one 20 Meg, 65 MS Hard Disk Drive— $1199

**EGAds! Color Systems**

- Intel 16-Bit 8088-2 System Unit running at 4.77 MHz and 8.0 MHz
- 640K on Motherboard
- AT™-Style 84-Key Keyboard
- 130 Watt Power Supply
- PC's Limited EGAds! Card
- PC's Limited EGAds! Monitor

with two 360K Floppy Disk Drives— $1229

with one 360K Floppy Disk Drive and one 20 Meg, 65 MS Hard Disk Drive— $1589

## A GUARANTEE THAT STANDS UP.

PC's Limited has established itself as the leader in PC technology. And the guarantee and warranty programs we offer put us ahead of the pack, too. Here are our terms in plain English.

30-Day Total Satisfaction Guarantee—Any item bought from PC's Limited may be returned within 30 days from the date it was shipped for a full refund of your purchase price. Returned items must be as-new, not modified or damaged, with all warranty cards, manuals, and packaging intact. Returned items must be shipped prepaid and insured, and must bear a PC's Limited Credit Return Authorization (CRA) on the shipping label.

One Year Limited Warranty—PC's Limited warrants the products it manufactures to be free from defects in materials and workmanship for one year following the date of shipment from PC's Limited. During the one year warranty period, PC's Limited will repair or replace, at its option, any defective products or parts at no additional charge, provided that the product is returned, shipping prepaid, to PC's Limited.

## PC'S LIMITED

**To buy PC's Limited computers, call us directly at . . . 1-800-426-5150**

**Calls inside Texas, 1-800-252-8336.**

Sales lines open 7 a.m. until 7 p.m. Monday–Friday, 10 a.m. until 3 p.m. Saturday, Central Standard Time

1611 Headway Circle, Building 3, Austin, Texas 78754

Sales Calls from anywhere in the country, (512) 339-6962, Technical Support Calls, 1-800-624-9896 or PC's Limited BBS (512) 339-4127

Customer Service Calls, 1-800-624-9897 or MCI MAIL: PC's Limited, Telex No. 9103808386 PC LTD FAX (512) 339-6721

G1

CIRCLE 539 ON READER SERVICE CARD

# Toshiba Mak
# Out Of Your

The more advanced something is, the simpler it should be to use. That's exactly what we had in mind when we designed our new printer, the P321SL. It doesn't just look sophisticated, it makes turning your hard work into hard copy a lot easier.

The fanfold bypass feature eliminates the need to unload the continuous form paper when using single sheets. Just insert and print. The auto-load feature does away with platen cranking for both fanfold and single sheet paper. Just pull a lever to instantly and accurately load either of them. There's even a built-in tear bar to make tearing off the continuous form paper at any point both neat and easy.

You won't be tearing your hair out trying to find and switch dip switches any-

more. There aren't any. The P321SL's front panel lets you choose type fonts, pitch, emulation, quiet mode, lines per inch, page length and more at the touch of a button.

Compatible as it is with you, the new P321SL is also compatible with IBM Pro-

# es Child's Play
# Paper Route.

printer.[1] Qume Sprint 11.[2] And of course our own P351. These emulations, in addition to five resident fonts, optional plug-in type font cards and downloadable type fonts, give you a lot to choose from. Without a lot of work.

There's another thing the P321SL gives you less of—options. That's because it comes with more standards like the tractor, quiet mode and IBM emulation.

Also standard is our excellent 24-pin print quality that's head and shoulders

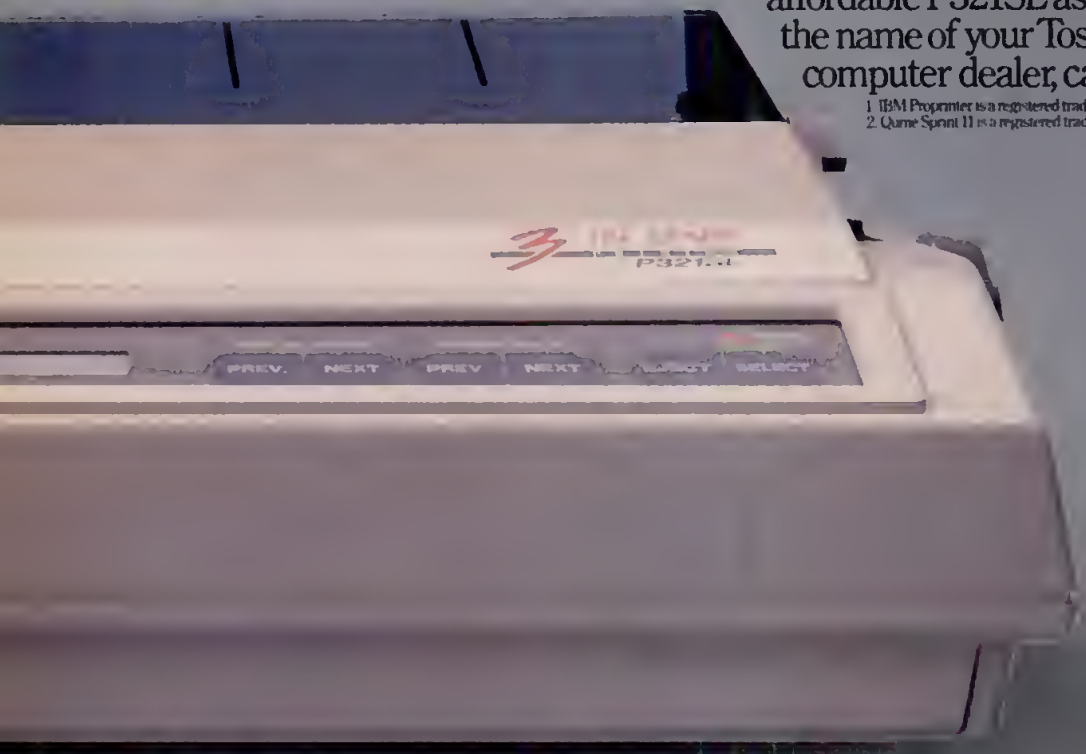
```
This is Toshiba 24 pin letter quality.
```

```
This is 9 pin printer quality.
```

above 9-pin heads. (Made even better with Toshiba's letter-quality multistrike film ribbon.) And high-resolution graphics. So really the only other options to consider are the sheet feeder and larger memory.

That should make choosing the affordable P321SL as easy as using it. For the name of your Toshiba printer and computer dealer, call 1-800-457-7777.

1. IBM Proprinter is a registered trademark of International Business Machines Corp.
2. Qume Sprint 11 is a registered trademark of Qume Corp.




In Touch with Tomorrow

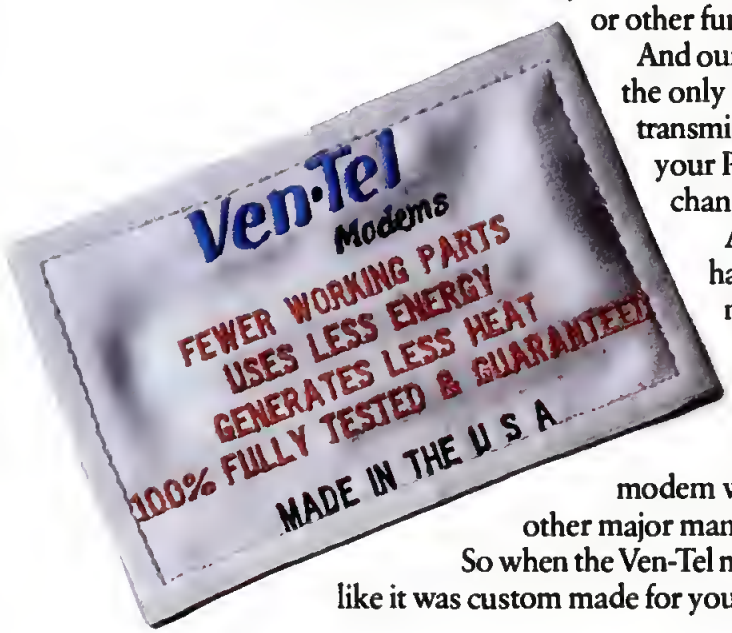
**TOSHIBA**

Toshiba America, Inc., Information Systems Division

# Pre-shrunk.
# Pre-fitted.
# Pre-thunk.

When you buy a Ven-Tel modem, you buy 12 years of well thought out, innovative technology that's custom-tailored to your needs.

Like the PC Modem Half Card,™ the first modem ever shrunk to fit into a short slot, so you'd have another long slot for more memory or other functions.




And our "pre-fitted" 2400 baud modem—the only 2400 that lets you double your transmission speed *without* reconfiguring your PC, buying new software or changing switches.

Another thing: other modems have 300 or so working components, ours have 70. That means they use less energy and generate less heat—the main cause of PC malfunctions.

Even so, we back every Ven-Tel modem with a free *five-year* warranty. No other major manufacturer even comes close.

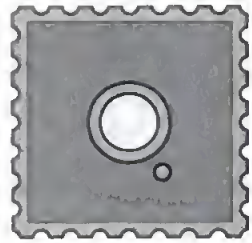
So when the Ven-Tel modem you buy off the shelf seems like it was custom made for your office, don't be surprised. It was.

**Ven-Tel**
**Modems**

Our free 24-page booklet, "How To Select The Correct Modem," contains specific information about our full line of modems. To request your copy, call 800-538-5121. In California, call 408-727-5721.

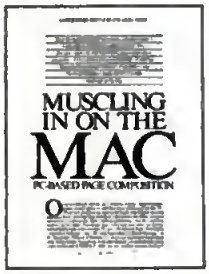
CIRCLE 364 ON READER SERVICE CARD

# LETTERS TO PC MAGAZINE



### LESSON IN GEOGRAPHY

I found your comparative article on desktop publishing useful and interesting ("Muscling In on the Mac: PC-Based Page Composition," *PC Magazine*, Volume 6 Number 3). It was very imaginative to dream up the bit about the new branch of BMI in Budapest. However, I was somewhat chagrined to see, on page 161, a star ostensibly showing the location of Budapest placed in Yugoslavia. It does not even show the correct location of Belgrade, the capital of Yugoslavia. Also, the geometric figure shading for the U.S.S.R. is the same as that used for Turkey. Finally, the headline "New Office to Open in Budapest" is out of keeping with the article, which describes 12 months of operation there.




George C. Szego
Annapolis, Maryland

*What do you expect? The map on page 161 was done on a Macintosh.—Ed.*

### MORE DISTINCTION

Although you made some positive comments about the construction and compatibility of the Tandy 1000SX (First Looks, page 52, *PC Magazine*, Volume 6 Number 2), we would like to point out that there is a lot more of a distinction between the new 1000SX and the plain old 1000 than a faster processor!

For example, the Tandy 1000 offers three expansion slots, one of which is required for more memory. The 1000SX has five slots, all of which are free in a 640K-byte machine, since all memory expansion is on the main board. The original Tandy 1000's built-in graphics cannot be disabled, and optional graphics cards will not work. The 1000SX accepts optional graphics cards, so you can install your favorite one. As to the "fuzzier pixels," you probably used our CM-5 monitor, which has a .63-millimeter dot pitch, instead of our newer CM-11 monitor, which offers a .42-millimeter dot pitch. "Fuzziness" in this case was probably a function of the monitor, not the computer.

Ed Juge
Director, Market Planning
Radio Shack
Fort Worth, Texas

Never have I seen a more biased review than the one on the Tandy 1000SX by Paul M. Stafford in "Tandy 1000SX: A Slight Improvement" in First Looks. I found myself in absolute disagreement with every statement of his review, except the one about the monitor he used. Obviously he was using a CM-5 monitor. One of the few mistakes Tandy has ever made was to introduce the free CM-5 low-resolution monitor. It really degrades the company's fine computers. Had Mr. Stafford known anything about Tandy products, he would have used the CM-11 monitor.

Doyle Goodman
Pittsburg, California

### NOT A TOY

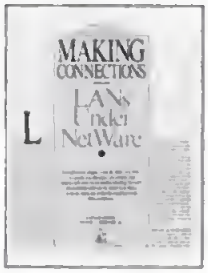
Thank you for your recent review of our *Streets on a Disk* (First Looks, page 46, *PC Magazine*, Volume 6 Number 2). While we appreciate Jonathan Matzkin's enthusiasm for the entertainment aspects of this product, we would be very grateful if you would inform your readers of the true nature of *Streets on a Disk*.

This product is not a toy. It is currently being used by real estate agents, transportation dispatchers, insurance agents, and salespeople. In fact, it can be argued that more businesses use street maps than word processors and spreadsheets combined.

Scott Klynas
President
Klynas Engineering
Simi Valley, California

### PRO PRONET-10

Regarding Frank J. Derfler, Jr.'s review of LANs ("Making Connections: LANs Under NetWare," *PC Magazine*, Volume 5 Number 21), it is our feeling that your testing lab does not fully understand Proteon's ProNET-10 networks and their relationship with Novell's *NetWare*. True, the ProNET-10 wiring scheme is involved, but some statements in your description seemed to be in direct conflict with Proteon's "ProNET-10 Network Configuration Guide."




In addition, the accompanying benchmark tests were unquestionably misleading, indicating a slower performance than our experience with Proteon's ProNET-10 and other networks would have led us to expect. Frankly, we suspect that you may have installed the network incorrectly, in such a way as to allow operation but at a slower-than-normal pace. This is a common symptom of cabling errors in a ProNET.

Another possibility is that your file server was configured in such a way as to

# Boost cursor speed.

# Stop cursor run-on.

With all the recent hoopla over performance, it's ironic that two of the PC's ergonomic deficiencies have been overlooked — its slow cursor, and the tendency of the cursor to remain in motion (run-on) after a cursor key has been released. Finally, the solution — Cruise Control™ from Revolution Software.

Cruise Control is a new productivity tool for serious PC users. It boosts cursor speed, typically by 3-5X. It eliminates annoying cursor run-on. And it adds hands-free cursor navigation to any application.

If you use 1-2-3, Symphony, dBASE, Reflex, or Paradox, you need Cruise Control's Anti-Skid Braking. Here's what the leader of one Lotus users group said about Cruise Control:

*"Once I used it, I wanted it! Excellent idea. Very practical. One of the best programs ever sent to us for review!"*

If you use Word Perfect, MS-Word, Q&A, DisplayWrite, MultiMate, WordStar 2000, Framework, PC-Write, or SideKick, you need Cruise Control's Screen Runner, the high-performance, adjustable-speed cursor.

Cruise Control's namesake feature takes the drudgery out of paging through data base records, long documents, and large spreadsheets. It lets you repeat any key, hands-free — at the speed of your choice.

And there's more. A Chronometer "types" the time or date into your application at the current cursor position. The keyboard-conirolled Screen Dimmer protects your privacy. The programmable Auto-Dimmer extends the life of your display screen.

Compatible with thousands of today's popular programs, including Lightning, SuperKey, and Ready!. Uses only 3K RAM. For DOS 2.0 or later. Not copy-protected. No risk, 60-day money-back guarantee.

# Cruise Control™

## Only $39.95

**Call now to order by credit card (VISA/MC/AX):**

## 201-366-4445

**Or, mail $39.95 plus $3.50 shipping and handling to:**

**Revolution Software, Inc.**

715 Route 10 East • Randolph, NJ 07869

Dept. 100

CIRCLE 534 ON READER SERVICE CARD




## ■ LETTERS

be a severely limiting resource. Such a problem would, of course, affect a high-performance network much more than the low-performance networks. We are very curious about how your server was configured, as your article gave virtually no details on this important aspect of the test.

David L. Hopkins
President
Micro/Mainframe Consultants
Houston, Texas

Frank J. Derfler, Jr., replies:

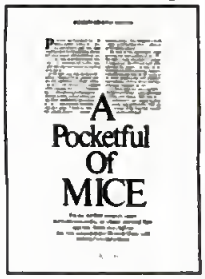
*Certainly, there is no area of local area network marketing and selection as controversial as benchmark testing. Anyone with some knowledge in this area can design a benchmark test to prove almost anything. However, you did highlight one typographical error in our LAN benchmark-test charts that has since been changed. The figure given for "zero stations" did not show the time it took to run the standard test on the XT's internal hard disk (this time was left off). This is fairly obvious since the times varied according to the network in use. The zero-stations line shows the results with only the standard test station running and no other stations loading the network.*

*As for your contention that we don't understand the Proteon networks or their relationship with* NetWare, *we admit that we have not implemented a wide-area LAN using what you term the "involved" Proteon wiring scheme, but hooking six stations to a single hub with the cables and cards provided by Proteon and watching the LEDs glow to make sure we got it right is not too hard.*

*As for the use of Novell's* NetWare, *we performed more than 50 installations and think we got it right the first time and every time thereafter. The important point is that in the series of tests published in the article, ProNET-10, StarLAN, and ARCnet were tested with exactly the same copy of* Advanced NetWare/286 *on the same AT. The only difference was the installation of new network drivers using the Novell menu. If some mistake was made in the installation or if the file server was configured to be a "severely limiting resource," it would affect all of these networks. Thank you for expressing your concern, but we stand by our results.*

### TWO IS ENOUGH

I have a few observations I'd like to share about Phil Wiswell's article "A Pocketful of Mice" (*PC Magazine*, Volume 6 Number 2). Although Phil Wiswell praises Microsoft's mouse for its comfortable, ergonomic design, he calls it "old-fashioned" because it has only two buttons. Our mouse is designed this way for some very good reasons.




We feel three buttons can compromise the ergonomics of the design and make the mouse unnecessarily complex. We also believe that asking users to remember seven combinations with a three-button device is too much. Most software developers agree with our approach because, as Mr. Wiswell notes, there is very little software that makes provisions for three-button mice.

Rich Abel
Product Manager
Microsoft Corp.
Redmond, Washington

### RUNNING PARSE FROM WINDOWS

I was a little shocked to find a program (PARSE.COM) in your Programming/Utilities column (*PC Magazine*, Volume 6 Number 2) that uses a potentially harmful "trick"! The way Mr. Mefford allocates (or should I say "steals") his buffer area is outrageous to say the least. I cannot help but wonder why he did not take the time to include the code to allocate a memory block (DOS function 48h) or even define the buffer as a DB type of 64K. What would happen if his program were being run from *Microsoft Windows* and it started reading data into the buffer and inadvertently overwrote another program that *Windows* was storing above it?

Mike Taylor
Maple Shade, New Jersey

Michael J. Mefford replies:

*PARSE requires 64K bytes of free applications memory. This is the minimum requirement you will see with most applications programs. Under default condition,* Microsoft Windows *will assign 52K bytes*

# *"Dac-Easy Base Lives Up to Its Name, Sets New Low-Cost DBMS Standard."*

*PC Magazine*
March 10, 1987

## A Powerful Relational Database That's Easy To Learn, Versatile, Very Affordable, And Much More.

Dac-Easy Base is indeed both powerful and easy to use. It offers a multitude of unique features to help you organize, locate, and sort all kinds of alphabetic and numeric data. Dac-Easy Base continues the low price/high performance tradition of the Dac-Easy Series. With worldwide sales of over 300,000 systems, Dac-Easy has become the new leader in software designed for small businesses.

### Flexible Menu System

Dac-Easy Base is actually two systems in one. If you are a novice you will appreciate the special Beginner Menu which contains the most commonly used features for creating, editing, and printing files. The more experienced database user will find the Advanced Menu allows instant access to each and every one of the powerful routines. In both menus, you are only a keystroke away from the context-sensitive help screens. The help screens in Dac-Easy Base are so complete you may never have to consult the accompanying 200 page manual.

### Easy File And Report Creation

Design professional-looking data input screens without leaving the menu structure. There is no need for complex programming. Once created, the edit screen allows you to input and edit your information in a matter of minutes. Also attach special notes to any of your records with the built-in MemoWriter. The MemoWriter is the perfect way to attach specific information to a single record. Custom reports are easy to create without using the available programming language. Column or page-style reports can be created quickly, and viewed on your computer screen or printed to paper. As with all reports generated by Dac-Easy Base, you can select which records will be included in your report and how they will be sorted. Special headings and subtotals can be added to give you the exact information you need.

### Great For Advanced Users

Yes, Dac-Easy Base is easy to use, and it is also very powerful. An unlimited number of records with up to 60 fields per record, ability to access up to three files at a time, date arithmetic capability, formula fields for calculations within files, dynamic abbreviations, and keyboard macros are just a few of the powerful features available at your fingertips. Dac-Easy Base can read and convert dBASE II files and can run DBASE II programs.

***"Dac-Easy Base is similar to dBASE II in appearance, yet it improves upon it in ease of use, system limits, on-line and contextual help, numeric accuracy to 15 digits, security by password, storage of more and larger memory variables, and on-screen report layouts. The program can interface with dBASE II files and emulate its dot prompt, though Dac-Easy's menus are the better matrix.***

***Everyone will be pleasantly shocked by its $49.95 price."***

*PC Magazine*
March 10, 1987

**To Order**
**Call Toll Free**
**1-800-992-7779**
(In Texas Call 1-214-458-0038)

**30 Day Money-Back Guarantee**

Dac offers a 30 day unconditional guarantee on all products bought directly from Dac Software (less shipping charges). There is a $10.00 restocking fee if the disk envelope is opened.

**Minimum Hardware Requirements**
IBM or other compatibles, 256K memory, MS-DOS or PC-DOS 2.0 or later, two DSDD drives, color or monochrome monitor.

IBM and PC-DOS are registered trademarks of International Business Machines. MS-DOS is a trademark of MicrosSoft Corp. dBASE II is a trademark of Ashton-Tate, Inc.
Dac-Easy and Dac-Easy Base are trademarks of Dac Software, Inc.

Mail to: ❀ **dac software, inc.**
4801 Spring Valley Rd., Bldg. 110-B
Dallas, TX 75244 (Ph. 214-458-0038)

**Yes,** please rush me ____ copies of Dac-Easy Base today. I have enclosed $49.95 (Texas residents add 7¼% sales tax) for each copy + $7.50 for shipping.

Name _____
Company _____
Address _____
City _____
State _____ Zip _____
Phone _____
Computer Brand _____

★ ★ ★ ★ Method of Payment ★ ★ ★ ★
☐ Check ☐ Money Order
☐ VISA ☐ AMEX ☐ MC

Account # _____
Expires _____
Signature _____
**CODE 116**

**CIRCLE 151 ON READER SERVICE CARD**

# "TIRED OF GREAT DEALS YOU CAN'T BUY?"

Order the PC-386. Not only a best buy (read on). But, it's available, now . . . when you call! The Regency PC-386 is a 80386-based personal computer system that has better speed, compatibility, expandability, and performance than you've ever seen before. At a low price.

Much of the credit goes to Intel's new, high-speed, 32-bit, 16MHz 80386 microprocessor chip, which is twice the bus width of an IBM AT and up to four times as fast. (It will even support a 24MHz operation, once Intel makes it available.) This means it can run your present software at speeds up to 20 times faster than a PC XT.

The Regency PC-386's state-of-the-art technology gives you minicomputer power. The 32-bit motherboard architecture with 1MB of 100 nanosecond chips gives you virtually instant data retrieval (18.5 Norton Speed Index Rating). You get expansion slots for both 16-bit and 8-bit boards, and you can add up to 10 MB of 32-bit memory too. You also get provisions for a 4, 8, or 10 MHz 80287 match chip for fast floating-point and transcendental computations. And pack the Regency PC-386 with up to 16 MB of RAM, or virtual memory up to 64 million Megabytes.

Get your work done faster than ever before. The Regency PC-386 lets you figure more complex accounting figures, design more intricate CAD/CAM projects, create bigger spreadsheets, sort larger databases, author longer documents, develop better software, speed-up your network server, and run virtually all types of PC software in less than half the time you do now.

The Regency PC-386 is the only 80386-based system on the market today supported by both a total satisfaction 30 day money-back guarantee and a 2 year parts & labor warranty. If you're not completely satisfied within 30 days from our shipment date, we will personally send a UPS truck — at our expense — to pick it up, and you'll receive an immediate 100% refund or exchange.

At these prices, why buy old technology? Order your Regency PC-386. It's available anytime. We're open 24 hours a day. 800-638-1900.

## REGENCY PC-386 BASE SYSTEM CONFIGURATION

- Intel 80386 Processor
- 32 Bit Architecture
- Socket for 80287 Math Co-processor
- 4.77, 6, 8, or 16MHz Switchable
- 32-bit RAM: 1MB (100 Nano-second Chips), Expandable to 10MB
- 32K ROM, expandable to 64K
- Network Compatibility: 3Com, Novell, IBM Token Ring
- 1 Serial and 1 Parallel Port
- Real Time Clock/Calendar With Battery Back-Up
- 4 Drive (2 Floppy/2 Hard Drive) Controller
- 1.2 MB Floppy Drive
- 7 Expansion Slots
- 220 Watt Power Supply
- AT-Enhanced Style Keyboard

| | SUGG. RETAIL | PC VALUES LOW PRICE | QTY. 2-5 | QTY. 6-10 |
|---|---|---|---|---|
| Regency PC-386 # PCVA-0010031 | $3,495 | $2,995 | $2,895 | $2,795 |
| Regency PC-386/20 (w/20MB 65MS HD) # PCVA-0010032 | $4,195 | $3,545 | $3,445 | $3,345 |
| Regency PC-386/40 (w/40MB 28MS HD) # PCVA-0010033 | $4,495 | $3,845 | $3,745 | $3,645 |

Dealer inquiries welcome, call (415) 461-0811.

**$400 BONUS.**
**Call Today For Details.**
**800-638-1900**

FAX your order, 415-726-3193. Or Telex your order, #62000031. We pay shipping within the Continental U.S.. Cash, check, money order, wire transfer, VISA and MasterCard accepted. A 3% surcharge on all American Express orders.

PCvalues

137 Main St.
Half Moon Bay, CA 94019

Returned items must be in new condition, not modified or damaged, with all warranty cards, manuals, and packaging intact. Returns may not be sent direct without first calling and obtaining a PC Values Return Material Authorization (RMA) number.

CIRCLE 121 ON READER SERVICE CARD

# A disk each month delivered to you...

## packed with programs for your PC.

**DISCOVER UPTIME.** You deserve the best from your PC. Have the best and save the most with UPTIME.

**You deserve value.** We make it easy and inexpensive — a disk each month. At UPTIME, we believe in value. That's why each month 30,000 people like you enjoy a disk packed full of programs and information.

**Make life easier & get the most from your PC.** Organize your life and be more productive with **home management** and **finance** programs. Have fun learning with **educational** programs. Relax with **games** and **adventures.** You'll find business, **utilities & more!** It's amazing just how much comes on every disk.

**Eight programs and more on every disk.** What's the opposite of "downtime"? It's UPTIME, of course. A disk each month, delivered to your door.

**It's easy, inexpensive & fun.** Too good to be true? There's more! Each monthly disk reviews the latest software, hardware & peripherals.

**Subscribe now and save.** You won't believe the low price! Satisfaction is guaranteed or your money back. Make the very next UPTIME disk yours. Fill out the coupon. For immediate service, call toll-free:

**1-800-437-0033**

anytime, day or night.

CIRCLE 218 ON READER SERVICE CARD

TOP QUALITY LESS THAN $1.00 each

NEW FOR ALL PCs

*A Typical Issue Includes:*

**Label Magic ■ Living Art ■ Yotsi ■ File Doctor ■ Financial Package ■ One Foundation ■ Calendar ■ Decision Maker**

I'LL BYTE!!! SAVE $89.90 ➜ 12 Disk Issues $89 ☐

I'm a PC enthusiast who wants more. Please start my subscription to **UPTIME** immediately.

6 Disk Issues $59 ☐ 3 Disk Issues $36 ☐ 1 Trial Issue $14.95 ☐

(Add $2 per issue in foreign countries, except Canada and APO)

Name _____

Address _____

City _____ State _____ Zip _____

Type of Computer _____

☐ Payment enclosed. (Make checks payable to **UPTIME**.)

Bill my: ☐ Visa ☐ MC Exp. Date _____

Signature _____

Account No. _____

*Send to:* UPTIME · PO Box 299 Newport, RI 02840 (401) 849-4925

# Get a new handle on your business with SBT.

Now you can handle up to 254 users, all working in the same data files, with the SBT MultiNet Database Accounting Library. The accounting software written in dBASE III PLUS.®

So whether your business is large or small, you can grow to the limits of the most advanced PC networks available.

When you want that special report, or your business needs something we didn't think of, you can quickly and easily modify our programs to meet your needs exactly (because our dBASE source code is included).

And if you don't have time to make the changes yourself, there's a nearby consultant who can make them for you.

So if your company has two users or two hundred and fifty, you can add customers, update records, and have as many people enter orders as it takes to keep your business growing.

Isn't it nice to know there's software you can't outgrow? The SBT MultiNet Database Accounting Library.

Now you can get a new handle on your business.

Call today for our demo disk, brochure and for the name of the SBT consultant in your area. (415) 331-9900.

THE SBT DATABASE ACCOUNTING LIBRARY.

| | | |
|---|---|---|
| dProfessional | Time & Billing | $395 |
| dOrders | Sales Order Processing | $295 |
| dInvoice | Billing/Inventory Control | $295 |
| dStatements | Accounts Receivable | $100 |
| dPurchase | Purchase Order | $295 |
| dPayables | Accounts Payable | $395 |
| dPayroll | Payroll/Labor | $395 |
| dLedger | General Ledger/Finance | $395 |
| dAssets | Asset/Depreciation | $295 |
| dProject | Project/Job Accounting | $395 |
| dProperty | Tenant/Unit Management | $395 |
| dMaterials | Material Requirements | $395 |
| dMenu/Backup | Menu/Backup | $ 65 |

MultiNet versions $200 additional per module

One Harbor Drive
Sausalito, CA 94965 (415) 331-9900
Telex 9102404708

SBT CORPORATION

Macintosh, Atari and compiled versions are available. Names indicated by ® or ™ are tradenames or trademarks of their respective manufacturers. © 1987, SBT Corporation.

CIRCLE 470 ON REAOER SERVICE CARO

## ■ LETTERS

*to an application. PARSE attempts to read 64,000 bytes at a time. To satisfy* Windows' *defaults, PARSE should have attempted to read only 50 bytes at a time.*

*The extra code to allocate memory is just that. The request to produce quality, sophisticated programs while keeping them as concise as possible is a challenge indeed. The overhead for checking for every environment situation can add up to a program in itself.*

*Obviously, the suggestion of a DB of 64K bytes is out of the question. Besides making an unnecessarily large file that eats up valuable disk space, it also would result in a magazine all of its own.*

*The solution to running PARSE from* Windows *is to include in the WIN.INI file, under the [PIF] section, the statement PARSE.COM=64. This will allocate the 64K required by PARSE.*

### ASSISTANCE APPRECIATED

On the strength of your evaluation, our office bought a copy of *AskSAM*, by Seaside Software ("TBMS: Database Power Unleashed," *PC Magazine*, Volume 5 Number 20). For document retrieval, list management, and other text-based data management purposes, *AskSAM* has proven to be an easy-to-use, appropriate, and powerful tool. We are only beginning to realize its potential applications in a small law firm like ours. Without *PC Magazine*'s timely and objective evaluation, we would not have become aware of this kind of program. Thank you for your assistance.

Neil G. McBride
Oak Ridge, Tennessee

### ALL TOO CASUAL

Although I appreciate your fine magazine, I would like to call attention to the sometimes all-too-casual nature of your editor and columnists, which detracts from your professional quality.

Words or phrases such as "blow 'em to hell" (From the Editor's Screen, *PC Magazine*, Volume 6 Number 1), "hooey" and "sexy" (Jim Seymour, *PC Magazine*, Volume 6 Number 1), and "hardly anybody does a damned thing" (Stephen Manes, *PC Magazine*, Volume 6 Number 1) are certainly not uncommon, but their use in a magazine of such high caliber can be deemed unprofessional.

One additional note: while many of your advertisements are quite informative and delightful, I wouldn't be disappointed to see the ads for *Interlude II* die a quick death. (Provocative and playful! Outrageous and romantic!)—indeed!

Richard M. Johnstone
North Little Rock, Arkansas

*We promise never to use "hooey" again.—Ed.*

### SOLD ON BROOKLYN BRIDGE

John C. Dvorak is certainly correct in describing White Crane Systems' Brooklyn Bridge as "fabulous" (Inside Track, *PC Magazine*, Volume 6 Number 3). The wise and knowledgeable salesman who sold me my Toshiba T1100 Plus also sold me the Brooklyn Bridge, and I love it! It sure beats the more-expensive and cumbersome external 5¼-inch drives that others were trying to push off on me.

Gordon J. Schochet
New Brunswick, New Jersey

### CORRECTIONS/AMPLIFICATIONS

*Enable/LAN*, from The Software Group, is selling in configurations of three or more workstation packages, with a base price of $1,495 for three (First Looks, page 59, *PC Magazine*, Volume 6 Number 3).

### HOW TO WRITE TO PC MAGAZINE

Do you have a comment, compliment, or criticism about something you've read in *PC Magazine?* A question you'd like to open up to other readers? Then send your opinion on paper or disk to Letters to PC Magazine, One Park Avenue, New York, NY 10016, or send your opinion through MCI Mail to PCMAGAZINE at address 157-9301.

All letters become the property of *PC Magazine* and are subject to editing. We cannot publish letters that do not include a name, address, and phone number for verification. We're sorry we're not able to answer letters personally. PC

MicroCom Systems
OUTSTANDING SOFTWARE
For IBM PC's and Compatibles

$3.50 PER DISK SMALL QUANTITIES
$3.00 PER DISK FOR TEN OR MORE
$1 OFF 6 DISKS OR MORE WITH THIS COUPON

☐ BUSINESS 1—EZ-Forms business form generation, completion end printing program
☐ CAD 1—Altemira, e 4 color object onented drawing program Color raquired
☐ COMM 4a,b,c,d,e—(5 disks) Letest RBBS Bulletin Boerd System 14 10
☐ DATABASE 1a,b—(2 disks) File Express menu dnven general purpose database mngr
☐ EDUCATION 1—Interactiva DOS tutorial for new PC users. Makes learning DOS painless
☐ GAMES 1—3-D PacMan, Kong, SpaceWar, JanitJoe, and mora Color required
☐ GAMES 2—Qubert, Pango, Centipeda, Monopoly, Zoerre, and more Color required
☐ GAMES 3—Blackjack (you set rules), Arm Cheir OB, and Empire (War Game)
☐ GAMES 4—Cestle, StarTrek, and tha onginal Colossal Caves Adventure.
☐ GAMES 5—Tha Hack adventure geme from the univarsities Like Rogua, only mora complex
☐ GAMES 6—Pinball, Othallo, Dragons, Sopwith (fly one), and more Color required
☐ INFO 1a,b—(2 disks) Cooking recipes database with keyword/ingredient retnevel
☐ LANGUAGE 5—Turbo Pascal interective debugger, pop-up help, formatters, et cetera
☐ LANGUAGE 7—Complete Pascel interpreter/compiler Greet for leerning Pescal!
☐ ORGANIZER 1—DeskMata, a Sidekick clona, end the Judy calendar progrem
☐ PINUP 2—Provocative high res digitized grephics pinups Graphics requirad
☐ PRINTER 1—Font and sidaways utilities, spoolers, banner makers, and more
☐ UTILITIES 1—A collection of invaluable general purpose DOS utilitias A must!
☐ UTILITIES 2—More invelueble DOS utilities Too many to list hare!
☐ UTILITIES 3—A comprehansiva sat of debugging end diagnostic utilities

PC-5/12/87

NEW RELEASES/UPDATES
☐ CAD 2e,b—(2 disks) An edvenced 2D/3D drafting prog 640k and color required
☐ COMM 1a,b—(2 disks) Version 2 4 of the everpopuler Omodem comm. progrem
☐ COMM 2a,b—(2 disks) Procomm 2 42, en excellent modem program with tarminal amulation
☐ EDUCATION 2—Learn the Presidents, States (and capitals) and more Color required
☐ EDUCATION 5—Learn Origami, the Japanese art of peper folding. Color required
☐ FINANCES 3a,b—(2 disks) Express Calc 3 12, a powerful spreadsheet program
☐ GAMES 8—Stnkar helicopter attack, and Risk, world domination Color required
☐ GAMES 9—EGARisk, the game of world domination in very high resolution EGA required
☐ GAMES 10—Solitaire, Teed-Off golfing, and Sailing in tha Bermuda triangle Color required.
☐ GAMES 12—MyChess (9 levels), Beckgammon, end Wheel of Fortune Color not required
☐ GRAPHICS-1—Record and play beck screen images! Excellent for demo, etc Color required
☐ INFO 2a,b—(2 disks) Zip-Phone, national ereacode/ prefix to zip-code cross reference
☐ LANGUAGE 3a,b—(2 disks) The A86 2 18 macro assemblar and debuggar
☐ SHELL 4—Automenu menu facility, and HDM II 4 04 hard disk menus.
☐ UTILITIES 5—Utilities for formatting, parking, end optimizing herd disk drives
☐ UTILITIES 6—Advenced utilitias including Dpath, Esc, Hotdos, Resident program utilities
☐ UTILITIES 7—More Advanced utilities including MesterKey (undeletes files from tiard disks)
☐ WORG 1a,b—(2 disks) PC Write 2 7, e powarful word processing system, w/spell checker

Catalog available, add $2. 3.5" format add $1/disk.

Cost of Items
CA Res 7% Tax
Ship/Handling Domestic $1./Foreign $5.
Total Enclosed

MicroCom Systems
(415) 325-6500
P.O. Box 51657, Palo Alto, CA 94303

CIRCLE 302 ON READER SERVICE CARD

# 10 BIG REASONS IT'S TIME YOU CHANGED YOUR EDITOR TO BRIEF

**1 FUNDAMENTAL TRUTH.** If you are a programmer, you use your editor more than any other tool. If it isn't the best, the fastest, the most versatile, the most productive... well, then neither are you!

**2 OUR ENTHUSIASM.** While we do not publish BRIEF we wish we did. We sell so many BRIEFs that we've been advertising it non-stop since it was introduced two years ago. We're not alone in our enthusiasm. There is no end of accolades from other admirers.

## BRIEF Encounters

"The word is getting around: that BRIEF is simply the best text editor you can buy." John Dvorak in *Infoworld*

"In the last five years, only a handful of applications have altered the way we use microcomputers. The winners' impact is astounding. BRIEF is a 'winner' that will most definitely change the way we develop application software." *Data Based Advisor*

"Overall, BRIEF is an excellent and efficient editor with capabilities that are truly useful. If you're a serious programmer or developer of commercial applications, the BRIEF/dBRIEF package is one of the best investments you can make." *PC Magazine*, 7/86

"Every time I've mentioned text editors I've got a raft of mail urging me to try Brief. Now that I've tried it I see why. It has windows—boy, does it ever have windows! It will do just about anything you want it to; look no further; recommended." Jerry Pournelle, *Byte* 12/86

Best editor of 10 compared
*Dr. Dobb's Software Tools*

**3 WINDOWS ON THE WORLD.** Why the excitement? First, BRIEF's architecture. *Any number of files* of virtually any length can be open. (Start brief with "*.*" to prove it.) Open as many tiled windows as fit the screen—over/under and side-by-side—to work on any of your files. Open, close, and resize windows as you go. In each window, full screen or tiny, all editing techniques are at hand—high-speed cursoring, paging up and down, horizontal scrolling, optional word wrap. Load the same file in any number of windows to view different areas simultaneously. A change in one changes all. Cut and paste text blocks between windows and files, or into buffers for later recall. All files stay in memory, so you can always go back to snip some more.

**4 UNDO. NOT UN-DELETE.** Don't confuse the two. BRIEF doesn't just keep snapshots of recent deletions should you want to pick them up from the cutting room floor. It can reel the whole film backward undoing any command that affected the cursor or the text. Watch it undo a global replace, for example. Uncanny. It can back up 300 times, all the way to the beginning of a session. "Works like a dream", said *The C Journal*.

**5 WHOLLY MACROS.** Much of BRIEF was written in its own macro language. It is that powerful! The language and its compiler come with every copy, as do many standard macros, with source code for learning by example. It is a complete language with conditionals, loops, recursion, global and local variables, even data types. It can control files, windows, and the keyboard. It has structure, 32-character variable names, and—not at all like 1-2-3®'s cuneiform—is entirely readable, like a hybrid of LISP and C. With it you can develop a library of routines to power BRIEF your way.

**6 SHELL GAMES.** Leave BRIEF, run your compiler, print out the error messages, load up BRIEF again? No way! Run your compiler from *inside* BRIEF*. It will point to each error line in your source program, still loaded in memory, for immediate editing. You don't have to leave BRIEF to use DOS either. BRIEF disappears from the screen to get out of your way, but say bye to DOS and BRIEF pops back to the screen, as do all the files you were working on.

**7 KEY WHIZ.** You can reassign BRIEF's command keyhits to whatever keys you're used to, even your old editor's, so you don't have to send your fingers back to school. Macro execution can be assigned to single keys. Or you can tell BRIEF to listen while you tap out a complex routine. It will save and playback faithfully, a shortcut macro without a single line of coding.

**8 MULTI-LINGUAL.** BRIEF's macro language is perfect for writing formatters for your language which indent, match up parentheses and brackets, and set up statement templates for fill-in. BRIEF comes with C language support already built in. Others have written macros to format Pascal, BASIC, LISP, Prolog, FORTRAN.

**9 QUICKER PICKER-UPPER.** Looking for something? BRIEF has full UNIX®-like expression search tools to forage and find and fix any file in memory. Literal strings with wildcards and "?" character masking, sure. But also indifference to case or intervening characters, [aeiou] to match all vowels, or [~ aeiou] to match anything *but* vowels, [a-f,l-m] to match character ranges, beginning or end of line searches, even multiple choice pattern matching and replacement.

**10 REASONS 11 THROUGH 20:**
**11.** BRIEF comes with a color option. You can select your own color scheme anytime. **12.** It supports EGA's 43-line mode and can display up to 128 lines long. **13.** Full 8-bit ASCII display; the whole character set can show on screen. **14.** Full path support. **15.** Command line start-up flags to modify BRIEF's behavior, change a path name, or run a macro; for example "wp" which turns it into a word processor with wraparound and margin setting. **16.** Automatic file save during idle moments. **17.** Compatibility with most stay-resident programs (like Sidekick™), multi-taskers (like Microsoft Windows™), and networks. **18.** A bulletin board with public domain macros contributed by a mushrooming cult of macromancers. **19.** No copy protection. **20.** Context sensitive help, and phone support from the publisher.

* Brief needs 192k normally, 320k for compile feature
* Product must be returned in resalable condition

## dBRIEF. The Power Environment for dBASE Programming

Many worthy utility products supply needs that dBASE®'s programming language doesn't—dUTIL™, dFLOW™ and a host of others. Trouble is, you have to use them separately, then combine their output into your dBASE program files.

No longer. dBRIEF™, written in BRIEF's macro language, grabs hold of BRIEF and turns it into a complete dBASE III and III Plus programming domain. Using BRIEF's underlying shell capabilities and its own interfaces, dBRIEF can run external utility libraries, plus dBASE itself, and link to the Clipper™, Foxbase+™ and Quicksilver compilers, all with dBRIEF still loaded and running the show. It can do what BRIEF already does, plus:

- Convert a screen layout into dBASE code for interactive data entry
- Display dBASE file structures in windows, a great convenience alongside your program files
- Expand keystrokes into full dBASE statements
- Indent automatically for elegic display
- Create databases, index files, invoke Ashton-Tate's dFORMAT™ and dCONVERT™, draw lines and boxes

Simply marvelous programming environment for writing and editing dBASE programs. *PC Magazine*, 7/86. Source code included!

Requires BRIEF 1.32 or later and 384k, 512k to run dBASE within dBRIEF. 640k and harddisk recommended.

Now if that isn't every last reason why you should switch to BRIEF, here is the clincher: You can try out BRIEF for 30 days with no risk at all! We offer a no-questions-asked money-back guarantee.* Enough reading. It's time for dialing.

You're sold! Call us at...

# 800 PC-BRAND

List Prices: BRIEF: $195. dBRIEF: $95
BRIEF/dBRIEF Combination: $275.

**PC BRAND Prices: CALL**

# PC BRAND™: CAREFULLY CHOSEN PROGRAMMER TOOLS

## INTERACTIVE-C

***All-in-One Interpreter, Editor, Debugger***

Interactive-C™ shows how far C interpreters have come. More than an interpreter, Interactive-C is a fully-integrated development environment: a complete K&R interpreter bound tightly to its own editor and "the best debugging facilities of any interpreter", says *Computer Language* 2/87.

Slice through programming projects like a hot knife through butter. Debugging tools include breakpoints, watch-values, stepping options and interactive viewing and modification of variables. An Interactive-C exclusive lets you interrupt to edit and "continue" from where you left off. Eliminates plodding replays of already debugged code.

Run Interactive-C using adjustable edit, command, and status windows. Toggle a second screen showing only your program's output—never any crowded intermixing. Or use twin CRTs. Load object code of your compiled functions or commercial libraries. Interactive-C has immediate mode, syntax checking both as you type and run, and cursor positioning that points precisely at an error.

Plus, you can port programs from Interactive-C to major compilers with no modifications—it's 100% compatible. Ask for E0590. List **$249**. PC Brand **$219**.

## HALO GRAPHICS SYSTEM *Multi-Board Graphics Library*

The premier graphics library that got the ball rolling for PC-based graphics and has grown so omnipotent that it supports over 25 graphics boards — including IBM's EGA and Nr. 9 Revolution's hi-res series — and has a multitude of mouse and printer drivers. All that in each box. Separate C versions for Lattice, M'soft, Aztec, C186. What does Multi-Halo do? A down to the last pixel graphics library plus functions to reset drivers so distributed program can run on anything. Wonderful value for single license. Costly royalties though for redistribution. Specify: S0315 & Language. List **$300**. We **$219.** With Dr. Halo II, a free-standing "paint". List **$440**, Us **$299.**

## WINDOWS for C/WINDOWS for DATA

***Microsoft Windows™ and TopView™ Compatible***

Windows for C™ is a library of over 80 functions to add the pizazz and practicality of window partitioning to your application. Unlimited windows, each defined in a C structure for easy reference throughout your program, can be made either to pop up or permanently overwrite the screen. Routines will scroll and highlight lists with arrow keys, will read and scroll ASCII files vertically and horizontally in windows, and even write to memory-loaded files off the screen.

Logical treatment of video attributes permits unchanged programs to run on color or monochrome. Colors of windows are set individually.

All functions are in separate modules, only those used are linked. Only buffers holding on-screen or temporarily obscured windows occupy RAM, others released dynamically. Best overall rating and fastest display in Bill Hunt's 7/85 *Tech Journal* review of five windowing products.

**Windows for Data** comprises all of Windows for C but takes in data through the windows as well. At the high level a single function lets you specify prompt string, field length, data type, screen location, picture, target variable, then sets lesser functions scurrying to get and process a user's input. There are utilities to get system date and time, mess with strings, create your own masks for fields.

Field options can require entry, prevent entry, permit insert or overtype, beeping on invalid or overflow keystrokes, and attachment of field-specific help messages and functions you want called to display messages or validate entries. And you decide which keys will clear a field, jump to the next or prior, quit, etc. Options diverse enough that a set of "fields" can be made to behave like a Lotus™ menu.

| Specify Compiler | List | PC Brand |
|---|---|---|
| T0100 Windows for C | $195 | $149 |
| T0150 Windows for Data | $295 | $259 |

## MICROSOFT C 4.0

***A Great C Battle Rages and You're Winning.***

As the dreadnaughts pound each other with ever heavier ordnance, today's programmers reap the spoils of this war. Bundling a source debugger and a "make", and sporting a "huge" memory model permitting single data objects larger than 64k, the Microsoft C compiler has jumped a full version number to 4.0. But what's really impressive are the benchmarks reported in Dr. Dobb's (8/86) encyclopaedic survey of 17 C compilers. Microsoft's and IBM's C (licensed from Microsoft) run away with the contest winning 11 of 27 benchmarks.

The CodeView™ debugger, free for a limited time, uses windows to show everything on one screen: source alongside disassembled object, variables, stack and registers. Drop down windows—use a mouse if you like—obviate learning of commands. "A source-level debugger that puts the rest to shame" (Dobb's).

Microsoft C now has five memory models for code and data, plus non-library support for another thirteen, and boasts alternate math packages for speed versus accuracy, with or without 8087/80287 chips.

Both linker and library manager are part of the package, as is the "make", a UNIX™ name for a smart batch program which knows to expend minimum effort to rebuild any size of project by compiling and assembling only elements affected by new or changed modules.

It is reportedly used by Lotus, Ashton-Tate and, fittingly, Microsoft itself to develop Windows. Dobb's calls it "the best MS-DOS C development environment value today [for] virtually any kind of program conceivable." 320k suggested.

| Ask for | List | PC Brand |
|---|---|---|
| G0500 | $450 | $295 |

## C-TREE & R-TREE *B-Tree File Manager Now Has Report Generator*

**c-tree:** The only major b-tree file manager that comes with built-in network support rather than a costly separate version, c-treeTM is sturdy code that has weathered many seasons of prolonged and widespread use. It comes in C source, so you can modify it to fit a special case, permits any number of keys for a data file—alpha, numeric, even floating point, handles files with varied record lengths, and multiple keys in one index file. In short, you get the works—and there are no royalties.

C-tree's design splits nodes to allow any number of users to access an index file simultaneously even when updates are in progress. So multi-user configurations and adaptation to networks are possible. Record-locking routines are provided for DOS 3.x, UNIX, XENIX.

C-tree can travel. Tests in many environments prove that c-tree gives your application a ticket to anywhere.

**r-tree:** thousands of c-tree users (and you) now have a suddenly expanded ability to produce ad hoc reports from files maintained by c-tree (v 4.1E or later), side-stepping the elaborate C coding usually entailed.

Once you link a description of the field characteristics of the data files to the r-tree library, you are free to use an ordinary text editor to write any number of report scripts with no further C coding. Reports can access data in several files: select to match complex searches, join the findings into new logical records, sort them, calculate new fields and columns, tabulate by any number of control breaks. Your script files show visual representations of report images—not just rows and columns, but customized layouts.

r-treeTM comes in source code and is designed for the same portability c-tree brings you. Fits any compiler.

| | List | PC Brand |
|---|---|---|
| c-tree F0660 | $395 | $329 |
| r-tree F0665 | $295 | $245 |
| Combined F0664 | $650 | $541 |

## dBC *Lattice Library Maintains dBASE Compatible Files With the Power and Speed of C*

dBC™ links C to dBASE. It creates and maintains files and their indexes which exactly replicate dBASE file design. So dBASE can read and update them. And the reverse. dBC can use any files created by dBASE. Now C and dBASE can operate on the same data bases interchangeably.

That opens up the widespread culture of dBASE installations to exploitation by C programmers. Tap that market, avoid the resident dBASE language, and gain the advantages of C with this single product.

dBC's functions parallel all dBASE's file handling commands, many decomposed to give closer control. Each backed by demo source files on disk.

Use dBC for custom work for clients, or on its own. It's a complete ISAM file manager for C whether or not dBASE will be used in tandem, supports all four memory models, and can have sixteen index and data files open. Big discount to buyers of both dBASE II and III versions. Specify Lattice, Microsoft 3.x, or DeSmet.

| Versions: | List | PC Brand |
|---|---|---|
| L0III For dBASE II | $250 | $195 |
| LCCII With Source | $500 | $390 |
| L0III For dBASE III | $250 | $195 |
| LCIII With Source | $500 | $390 |

## PANEL *Feature-Laden Screen Design Tool*

Writing your own screenware can blow completion dates and profits. Panel™ works with you interactively to set up foolproof screen displays and data entry forms rapidly. Output is C source code.

Not just single plane: layer your screen designs with up to ten overlapping images. Background pop-up lists, help boxes, and alternate input fields.

Panel builds in a user interface for keystroke movement within and between fields, supplies validation routines for checking user field entries. Diverse attributes may be selected for any field — size, data type, color, conversion of input to upper case, clearance of existing data when new entry is started, masks for standard formats (eg, dates), phrases which fill in when their first letter is typed, multiple-choice lists from which to choose by cursoring a highlighted bar. Fields may be multi-lined and scrolled if larger than the screen space allotted them. Specify S0400 & Compiler. List **$295**. Us **$229**.

## 30-DAY MONEY-BACK GUARANTEE

We refund the purchase price of any product returned within 30 days in entirely resalable condition. **You can even try out programs themselves** if product code begins with E, T, or L through N — even if it means breaking the disk seal. Some developers do pose limits, so for products beginning with other letters, opening sealed disks constitutes acceptance. But you can at least review the manual. There's just nothing stopping your buying from PC Brand.

## WHY US?

- Latest versions of all products
- Everything listed is in stock
- Shipped 24 hours or sooner
- No surcharge for credit card or COD purchase. **NEED TERMS?** On-the-spot credit to most public companies, government, educational, medical institutions. **LOOKING FOR SOMETHING?** We can get many more products — just ask! **NEED MORE INFO?** Our Catalog and literature cover just about everything.

*For Orders, Literature, or Catalogs, Call Us at...*

# 800 PC-BRAND

That's (800) 722-7263. In NY State call (212) 242-3600

PC Brand, 150 5th Ave., New York, N.Y. 10011-4311

Telex: 667962 (SOFT COMM NYK)

©1987 PC BRAND

Prices, terms and specifications subject to change without notice

# TODAY's TOP QUALITY AIDS TO PROGRAMMING PRODUCTIVITY

## GREENLEAF *Bountiful* FUNCTIONS *Harvest*

C source, assembler source, and binary libraries of 225 functions for many compilers. Emphasizes tight functional groupings to minimize loading code which your application may never use. Manual helps select functions, bulletin board, too.

A sampling: *DOS* extensions for file and directory manipulation. *Screen*: to select mode, page, monochrome or color, palette, cursor shape, positioning, cleaning and scrolling; pixel get and put; read light pen. *Strings*: Center, justify, etc., efficient list operations which add, delete, sort string pointers for top speed. *Other*: graphics character primitives, keyboard status, function key assignment, time/date, read registers and memory size, peek and poke. Mature best-seller. Specify S0770 & Compiler. List $185. Here $139

## SUPER SOURCE!

### *Aldebaran's Source Print*

Structure is dandy but, face it, hard to find your way around in. Source Print's options can print your programs adding page numbers and headings, those mysterious line numbers your compiler refers to, vertical lines connecting "begins" and "ends" and curly brace structures, however long or nested, indents automatically so you needn't bother, and throws in a table of contents and cross-reference index for good measure! Leaves a truly professional audit trail. "Occasionally a utility comes along that makes a programmer's life much easier. Source Print is such a program." *PC Magazine*. 9/86. Ask for H0005. List $75. Ours $60

### *...and Tree Diagrammer*

Prints an organization chart of your program's structure showing the hierarchy of function, procedure and subroutine calls. Shows at a glance what routines call each other for clearer debugging. Easy-to-use menu with point-and-shoot file selection. Ask for H0007. $55. Ours $45.

## GREENLEAF *Hello World* COMMUNICATIONS

Want your application to communicate with other users or remote date bases by asynchronous communications built right into your C programs! Even if you don't need it now, that's a skill to have at the ready!

120 functions *and demo programs* in *both C and assembler source code* set up separate transmit and receive ring buffers for up to 16 simultaneous channels. Interrupt driven so you can halt an incoming record, display it, file it, let the user edit it, then continue. Goodbye separate communications software.

Supports up to 9600 baud, ASCII or binary, any parity or word length, 8250 UARTs, Xon/Xoff and Xmodem, WideTrack receive. Specify S0750 & Compiler. List $185. Us $139

## RUN/C *Interpreter Links Binary Libraries*

Run/C Professional™ has a screen interface as simple as PC BASIC with full-screen editing and familiar commands like LOAD, LIST, MERGE even TRON and TRACE. Just write and RUN.

Best of all it dynamically loads potentially any major commercial function library compiled with Lattice's large model (512k recommended) and Lattice C required for external libraries).

Lots more features: system interrupts a shell command to invoke any operating system command without exiting, built-in debugging aids. Ask for S0950. List $250. PCB $185.

## DAN BRICKLIN'S DEMO PROGRAM

### *Storyboard Your Program*

The Legendary One has created Metaphor Two when the rest of us are still on Zero. Dan's first was the original electronic spreadsheet (VisiCalc™). This one is for programmers.

Words don't express program ideas because programs are screens! Dan's Demo creates slide shows. Create a screen — a snapshot of your planned product as it runs. Anything goes: words, borders, box rules, inverse and underlining of monochrome, fore- and background color. Copy this "slide" to an empty screen. Change it a little, to show the next instant of run-time. Do it again. Presto, a whole slide show of your program in action.

All 250 characters and attributes are available from scrollable lists which pop to the screen. All commands are layered in Lotus-style pop-up menus. Frequent choices mapped to function keys as well.

80x25 character mode, not bit-mapped.

Screen areas can be blocked for cut and paste or filled with color or characters, even blink. Slides can overlay on others, can be shuffled, deleted. Slides can proceed at time intervals or branch anywhere in the slide sequence depending on user keyhits.

Invaluable to prototype the program you are about to write, to position the labels, choose the color decor, smoothe out the keystroke interface. Or load the "capture" utility and snapshot the screens of any running program for an instant slide show.

Each copy entitles you to redistribute fifty of the slide projector program that runs demos. Plain manual, no binder keeps price of big product small. "Might become *the* essential tool in ... user interface prototyping," *Tech Journal*. Ask for N0100. List $75. US $69

## BASTOC OPTIMIZES!

### *Translates BASIC Into C*

For a trifling price, BASTOC™ moves truckloads of BASIC code over to C. It's a translator which takes in Microsoft Extended BASIC and emits pure K&R C for Lattice 3.0. It will optionally convert your program into a single monolithic C function or decompose it into separate functions, one for each GOSUB label.

Version 2's optimization dramatically reduces execution time. Converts to integers those variables in BASIC programs which do not need floating point. Where BASIC uses full assignment statements to increment counters, BASTOC converts to C's compact form. Strings dynamically allocated ridding your application of BASIC's catatonic halts for garbage collection. Creates structure of even convoluted BASIC code. Huge worksaver.

| Ask for | List | PC Brand |
|---|---|---|
| S0375 | $495 | $399 |

# Shopping List for the Power Workbench

| | LIST | US |
|---|---|---|
| **ASSEMBLERS & DEBUGGERS** | | |
| **Advanced Trace-86** *Morgan, ASM Interpreter* | 175 | 119 |
| **Codesmith-86** *Dubugger by Visual Aga* | 145 | 99 |
| **CSD Debugger C** *source level by Merk Williems* | 75 | 55 |
| **C-Sprite Debugger** *by Lattice, source level* | 175 | 139 |
| **Microsoft Macro Assembler** *with Utilities* | 150 | 109 |
| **PASM86** *by Phoenix, Macro Assamblar* | 195 | 125 |
| **Periscope I Debugger** *Date Bese Decisions* | 295 | 235 |
| **Periscope II** *Data Basa Dacisions* | 129 | 99 |
| **Periscope II-X** *software only* | 115 | 74 |
| **Pfix86 Plus** *by Phoenix, Symbolic Debuggar* | 395 | 235 |
| **BASIC LANGUAGE** | | |
| **BetterBASIC** *Summit Software* | 195 | 165 |
| *8087 Math Support* | 99 | 85 |
| *Btrieve Interface* | 99 | 85 |
| *Run-Time Module* | 250 | 225 |
| **Microsoft BASIC Interpreter** *for XENIX* | 350 | 295 |
| **Microsoft QuickBASIC Compiler** *full BASICA* | 99 | 79 |
| **Professional BASIC** *by Morgen* | 99 | 69 |
| **True BASIC** *True BASIC Inc* | 150 | 99 |
| *Run Time Module* | 150 | 99 |
| **C COMPILERS** | | |
| **C-86 Compiler** *Computar Innovations* | 395 | 289 |
| **Lattice C Compiler** *from Lattice* | 500 | 299 |
| **Let's C Compiler** *by Mark Williams* | 75 | 55 |
| *with CSD Source Leval Debuggar* | 125 | 90 |
| **MWC-86: Merk Williams C Development** | 495 | 389 |
| **Microsoft C Compiler** *4.0* | 450 | 295 |
| **C INTERPRETERS** | | |
| **C-Terp** *by Gimpel Software* | 300 | 249 |
| **Instant C** *by Rational Systems* | 500 | 395 |
| **Interactive-C** *by IMPACC with debugging* | 249 | 219 |
| **RUN/C Professional** *from Lifeboat* | 250 | 185 |
| **RUN/C** *without Loadeble Libraries* | 120 | 109 |
| **TEXT EDITORS** | | |
| **Brief** *from Solution Systems* | 195 | Call |
| **Edix** *by Emerging Tech...Multi-screen* | 195 | 159 |
| **Epsilon** *by Lugeru Software, like EMACS* | 195 | 149 |
| **FirsTime** *by Spruce Technology, C syntax* | 295 | 229 |
| **Kedit** *by Mansfield, similar to Xedit* | 125 | 99 |
| **LSE, the Lattice Screen Editor** *Multi Window* | 125 | 100 |
| **Pmate** *by Phoenix, with Macros* | 195 | 115 |
| **Text Management Utilities** *Grep, spfet, diff, etc.* | 120 | 100 |
| **Vedit** *by Compuview* | 150 | 99 |
| **Vedit Plus** *by Compuview* | 185 | 129 |
| **FILE MANAGERS** | | |
| **Btrieve** *by Softcraft, no royalties* | 250 | 195 |
| **Btrieve Network** *by Softcraft* | 595 | 485 |
| **C-Tree** *by FairCom - no royalties, source* | 395 | 329 |
| **R-Tree** *by FairCom-Report Generator* | 295 | 245 |
| **C-Tree & R-Tree Combo** *by FairCom* | 650 | 541 |
| **dBC...from Lattice...maintains DBASE files** | 250 | 195 |
| *with source* | 500 | 390 |
| **dBC III Plus...supports multi-user DBASE** | 750 | 595 |
| *with source* | 1500 | 1185 |
| **dbVista** *single user DBMS by Raima* | 195 | 139 |
| **dbVista** *multi-user DBMS* | 495 | 399 |
| **Opt-Tech Sort** *Can sort Btrieve files* | 149 | 105 |
| **SCREEN DESIGN** | | |
| **Curses** *by Lattice, UNIX screen designer* | 125 | 99 |
| *with Source* | 250 | 199 |
| **Greenleaf Data Windows**.....*New* | 225 | 169 |
| *with source* | 395 | 297 |
| *source purchased later* | 225 | 169 |
| **On-Line Help** *from Opt-Tech Data* | 149 | 105 |
| **Panel** *by Roundhill, no royalties* | 295 | 229 |
| **View Manager for C** *by Blaise* | 275 | 164 |
| **Vitamin C** *by Creative Programming* | 225 | 198 |
| **VC Screen** *by Creative Programming* | 100 | 81 |
| **Windows for C** *Vermont Creative Software* | 195 | 149 |
| **Windows for Data** *includes Windows for C* | 295 | 259 |
| **ZView** *Data Menagement Consultents* | 245 | 175 |
| **GRAPHICS** | | |
| **Essential Graphics** *by Essential, no royalties* | 250 | 210 |
| **GSS Graphics Development Toolkit** | 495 | 375 |
| **GSS Kernal System** *by Graphic Software* | 495 | 375 |
| **GSS Metafile Interpreter** | 295 | 235 |
| **GSS Plotting System** | 495 | 375 |
| **Helo** *by Media Cybernetics* | 300 | 219 |
| *with* **Dr. Helo II** | 440 | 299 |
| **Helo for Microsoft** *includes all fonts* | 595 | 434 |
| **COMMUNICATIONS** | | |
| **Asynch Manager** *by Blaise, for C or Pascal* | 175 | 117 |
| **Greenleaf Communications** *by Greenleaf* | 185 | 139 |
| **PTel** *by Phoenix, Binary File Communicator* | 195 | 115 |
| **UTILITY LIBRARIES** | | |
| **Blaise C Tools Plus** | 175 | 117 |
| **Blaise C Tools** | 125 | 84 |
| **Blaise C Tools 2** | 100 | 87 |
| **C Food Smorgasbord** *by Lattice* | 150 | 109 |
| **C Utility Library** *by Essential, 300 functions* | 185 | 139 |
| **Greenleaf Functions** *by Greenleaf Software* | 185 | 139 |
| **PtorCe** *by Phoenix, vast library* | 395 | 235 |
| **Software Horizons Packages** | Var | Call |
| **TopView Tool Basket** *by Lattice, source avail* | 250 | 199 |
| **DEVELOPMENT TOOLS** | | |
| **Code Sifter** *by Devid Smith Software, Profiler* | 119 | 89 |
| **C-Worthy** *by Custom Design Software* | 295 | 269 |
| **C-Worthy for Network** *Menus, help, errors* | 495 | 449 |
| **Dan Bricklin's Demo Program** *Prototyper* | 75 | 69 |
| **LMK from Lattice** *by Lattice, "make" like UNIX* | 195 | 149 |
| **Microsoft Window Development Toolkit** | 500 | 365 |
| **PC-Lint** *by Gimpel Software, alter UNIX's "lint"* | 139 | 125 |
| **PFinish** *by Phoenix, EXE performance analyzer* | 395 | 235 |
| **Plink86 Plus** *Utilizes memory for overlays* | 495 | 325 |
| **Pmaker** *by Phoenix, like UNIX "make"* | 125 | 85 |
| **Pre-C** *by Phoenix, UNIX "lint"-alike* | 295 | 155 |
| **Ptentasy Pac** *six Phoenix products* | 1295 | 875 |
| **OTHER TOOLS** | | |
| **BASTOC** *by JMI, convert BASIC to C* | 495 | 399 |
| **BASIC-C** *BASIC's functions added to C* | 175 | 139 |
| **The HAMMER** *by OES Systems* | 195 | 139 |
| **Report Option** *by Softcraft, Btrieve Report Gen.* | 145 | 128 |
| **Xtrieve** *by Softcraft, Query Utility for Btrieve* | 245 | 220 |
| **FORTRAN COMPILERS & UTILITIES** | | |
| **ACS Time Series** *by Alpha Computer Service* | 495 | 405 |
| **Forlib- Plus** *by Alpha Computer Service* | 70 | 45 |
| **Microsoft FORTRAN** *Links with Microsoft C* | 450 | 281 |
| **Microsoft FORTRAN** *for XENIX* | 695 | 546 |
| **RM/FORTRAN** *by Ryan McFarland* | 595 | Call |
| **Scientific Subroutine Package** *by Alpha* | 295 | 239 |
| **The Statistician** *by Alpha Computer* | 295 | 239 |
| **Strings & Things** *by Alpha Computer* | 70 | 45 |
| **OTHER LANGUAGES & UTILITIES** | | |
| **Microsoft COBOL Compiler** | 700 | 499 |
| **Microsoft COBOL Compiler** *for XENIX* | 995 | 795 |
| **Microsoft COBOL Tools** *with Source Debugger* | 350 | 259 |
| **Microsoft COBOL Tools** *for XENIX* | 450 | 333 |
| **Microsoft Lisp** *New Common Lisp* | 250 | 189 |
| **Microsoft MuMath** *includes MuSimp* | 300 | 199 |
| **Microsoft Pascal Compiler** *Links with M'soft C.* | 300 | 199 |
| **Microsoft Pascal Compiler** *for XENIX* | 695 | 546 |
| **PDisk** *Phoenix's new disk manager* | 195 | 125 |
| **RM/COBOL** *by Ryan-McFarland* | 950 | Call |
| **RM/COBOL 8X** *ANSI 85 COBOL* | 1250 | Call |
| **Source Print**...*source code formatter* | 75 | 60 |
| **Tree Diagrammer**...*source code diagrammar* | 55 | 45 |
| **Halp/Control** *by MDS...123 style Halp* | 125 | 109 |

# PRICED TO SAVE YOU MONEY, SHIPPED FAST ANYWHERE. BEST PRICES YET!

## PHOENIX POWER PFORCE

### *Pfunction Pfestival*

The ultimate integrated C library offering everything from low level functions for hardware access to complete b-tree database management. Along the way are fundamentals for string manipulation, time/date calculations, field and screen editing, but also four styles of menus (Lotus included), windowing, background tasking, DOS interfaces, directory management, even interrupt-driven communications.

Beyond tools for application development are programmer utilities for disk library management, archiving and compilation. Design emphasizes objects so characteristics of windows, databases, records and fields can be established outside functions.

One large collection in place of bits and pieces means one consistent set of instructions, everything in a single index. PforCeTM has tutorials, examples, quick reference and on-line help.

Everything in source, no royalties, all memory models of Lattice, Microsoft, Specify. S0220 & Compiler.
List **$395**. PC Brand **$235**.

## PRE-C

### *Pick the Lint from Your Program*

Pre-C™ is like UNIX's 'lint'. It finds problems your compiler won't. Problems that a debugger will have trouble figuring out. Even problems which will cause trouble with other compilers.

Compilers work with one module at a time. They don't see other modules which only meet at link time. Pre-C looks at *all segments of your program at once* and reports inter-module calamities: conflicting data type declarations, parameter lists in function calls which disagree with the functions themselves, machine-dependent expressions which inhibit portability, obsolete usage, casts with suspect conversions, variables never used, functions never called.

Adheres to Unix System III standard for portability. Ask for P0590.
List **$295**. From Us **$155.**

## ZVIEW

### *Screen Design Aid*

A complete package for screen design with full windows management as a bonus! Easy creation of screens with complex validation, such as range checking or required/optional data. Powerful Screen Paint utility for creating or editing applications screens. Built in security levels, set at run-time, control read or read/write access by field or screen. Automatic help screen processing for run-time aid per field or screen. Applications regain control during field tabbing, allowing run-time on-screen transaction processing or flow control. Run-time functions include Screen Read and Write with automatic transparent data conversion from screen image to data storage, Field Editing, Help Screen Processing, even a capability to change any field characteristic at run-time, plus Window Push Pop and Scroll. Versions for Lattice, Microsoft and Aztec C. Automatic free updates to registered users. No run-time royalties.
List **$245**. PC Brand **$175**.

## PLINK86 PLUS

### *Cached Overlays Maximize Memory Use*

Plink86™ shoehorns large programs into small machines by swapping program segments in from disk. Because modules share memory a 512k program could run in a 128k machine, for example. But Plink86 is smarter than that: if it finds itself in a larger machine, it moves into leftover memory whatever program overlays will fit. Overlays now swap at memory speed not disk speed. Can automatically restore a displaced overlay to which a subsequently called overlay must now return, and can assign library modules either to the root segment or to overlay areas. Long indispensable to serious developers. Ask for S0499. List **$495**. Us **$325.**

## LATTICE C COMPILER

### *Major Upgrades to the Best Selling C Compiler*

Lattice now embraces key UNIX™ enhancements which have entered the language since K&R: void functions returning no value, enumerated data types to assign stepped values to variables, data passing between structures by assignment.

The greatly expanded libraries (325 functions!) enable the file sharing and record locking provisions of DOS 3.1, provide a full complement of transcendentals, and a host of utilities to mimic the UNIX and XENIX™ environments.

Lattice 3.0 defaults to the ANSI proposed standard when you need strict adherence, but command line options restore leniency. And it adopts ANSI checking of external function arguments by data type to kill bug swarms when modules join up at link time.

Lattice now delivers smaller .EXE files, boasts very fast link times and a more efficient aliasing algorithm. New options generate code to use 80186 and 80286 features, 8087 of course sensed and utilized. Lattice has enjoyed pre-eminence so long that developers have created far more snap-on tools for Lattice C than any other compiler. William Hunt's *PC Tech Journal* review of 12 compilers awarded Lattice the only "very good" rating for add-on library availability.

| Ask for | List | PC Brand |
|---|---|---|
| S0100 | **$500** | **$299** |

### FOREIGN POLICY

***We ship anywhere.*** *Phone or Telex your order. Credit cards: We need card number, expiry date, name and address of card. Or wire funds to PC BRAND, c/o Chemical Bank, 126 East 86th St., NY NY 10028, Account No. 034-016058.* ***We'll ship immediately*** *and confirm by Telex if you provide number.*

## BLAISE C Tools Plus

Nothing pays you back quicker than a function library and Blaise has long been known as a great one. C Tools Plus, the top of the line, now has over 200 functions. Mature, tight, predominantly in C, they isolate hardware dependence, come in source and library with no royalty. The rundown:

Screen Handling either via BIOS or direct to video adapter, supports EGA 43-line mode and multiple pages, twin monitors. Windows any number, stackable, writable, wordwrapable and erasable. Interrupts, well known for interrupt service routines in C from which you can now access DOS functions. Directories: Create, change or search directories, rename files, get and change their date/times. Memory control: DOS memory allocation, load a child process alongside your program, even create memory-resident programs—and remove them. Strings: international money, dates and character sets, plus superfunctions to perform several tasks with a single call. General: BIOS and DOS gates for direct access, memory copy, speaker control, it goes on. Our complete Blaise line:

| | List | PC Brand |
|---|---|---|
| C Tools Plus | **$175** | **$117** |
| C Tools | **$125** | **$ 84** |
| C Tools 2 | **$100** | **$ 67** |
| Asynch Manager | **$175** | **$117** |
| View Manager | **$275** | **$164** |

## GSS GRAPHICS SYSTEM

### *Leave the Device Driving to GSS*

ANSI CGI STANDARD! PRICES CUT!

GSS™ has reconfigured two components of its comprehensive graphics tools to conform with the ANSI Computer Graphics Interface (CGI) standard.

At the heart of the system is the Development Toolkit which contains all language interfaces and device drivers for keyboards, mice, joysticks, tablets, printers, plotters, cameras, and more. Drivers house management of vector graphics (plotters) and bitmaps used by raster input devices (scanners) to insulate the application program from concern for device idiosyncracy. No one else has implemented CGI that way. It means your programming remains generic: just switch drivers and the same program will drive a different device.

GSS Kernel™ conforms to level 2b of ANSI's Graphical Kernel System (GKS) and contains all its needed drivers and language bindings. Kernel has macro level tools to draw and color an object, store the sequential instructions and recreate the object on its own, as well as segment it, transform it, etc. So powerful, a single command may represent several score lower level statements.

Plotting has the equivalent GKS tools for graph and chart generation and their captioning: hand it apples and oranges, say 'pie', and it bakes the numbers into a digestible display for screen or plotters.

Kernel and Plotting have tools to convert images they create to ANSI Computer Graphics Metafiles (CGMs), a tokenized standard for storing every form of graphic image as data. The Metafile Interpreter reads the contents of a CGM and interprets it with full CGI capability for re-creation on various devices.

Quality software? IBM thinks so. They sell the GSS series under their own label.

Unit royalties and annual fees have been instituted for redistribution. Needs 256k.

| Ask for | List | PC Brand |
|---|---|---|
| GS010 CGI Dvlpmt Toolkit | **$495** | **$375** |
| GS020 Kernel System | **$495** | **$375** |
| GS025 Kernel for IBM RT | **$795** | **$645** |
| GS030 Plotting System | **$495** | **$375** |
| GS040 Metafile Interpreter | **$295** | **$235** |

## BTRIEVE

### *Queen B-tree File Manager Abdicates Royalties*

ASK ABOUT XTRIEVE & RTRIEVE

There's no longer a tithe to incorporate Btrieve™ in applications, a welcome proclamation if royalties would ruin your profit margins. Btrieve takes complete charge of all file creation, indexing, reading, writing, insertion, deletion, space recapture, forward and backward searching. It builds function call "commands" right into the language you use, interfaces to C, Pascal, BASIC, and COBOL, with sample programs in all four, come with each copy.

Btrieve has mainframe specifications: its balanced-tree indexing scheme finds any key in a million in four or less accesses. Files may have up to 24 indexes; fixed record length to 4090 characters, indexes up to 255 characters, files of 4 billion bytes. Can even extend a file across two drives — even two hard disks!

Version 4.x speeds DOS interaction for large multiply-keyed files, enables variable length records of virtually any length, verifies accuracy (optionally) with read after write, useful in gritty environments, offers password and data encryption.

There's also Xtrieve, for Btrieve file inquiry and data manipulation, and Rtrieve for report writing. All three in versions for any network that supports the MS-DOS 3.1 file sharing function.

| Ask for | List | PC Brand |
|---|---|---|
| S0650 | **$250** | **$195** |
| S0652 Network Version | **$595** | **$465** |

**TERMS AND CONDITIONS OF SALE**

**Licenses:** Each price is for a license to use a product on a single computer and does not constitute its ownership. We will inquire for you about site licenses. Except as otherwise indicated or where "#" follows the Product Code, products may be used to create programs for distribution without royalty payments or additional licenses, provided said programs do not substantially replicate the products themselves.

**Compatibility:** PC BRAND's standard products are designed to operate with the IBM® PC, XT or AT under PC-DOS and require no more than 128k of RAM unless indicated. Non-IBM machines using MS-DOS, contact manufacturer about precise differences so we can advise.

**Returns:** See box page one. Defective parts will be replaced. Please call for authorization to return a product for refund.

**Payment:** We honor MasterCard, Visa, American Express (no surcharge), checks in advance or funds wired to PC Brand, c/o Chemical Bank, 126 East 86 St., New York, Account 034-016058. COD (U.S. only) for cash, money order, certified check (no fee). NY State add sales tax. Purchase orders accepted from larger corporations and institutions at our discretion if you agree to net 30 days plus 2% a month late penalty thereafter.

**Shipping & Handling:** U.S.: UPS Surface 1st product $6, each add'l $3; UPS 2nd Day Air 1st product $10, each add'l $4.50; UPS Next Day Air or Federal Express 1-2 Day Air 1st product $18, each add'l $6; FedEx Next Day 10 AM 1st product $28, each add'l $7. International: Charges vary by destination and carrier. $10 per shipping container for export forms. Air parcel post at your risk beyond collected insurable amount.

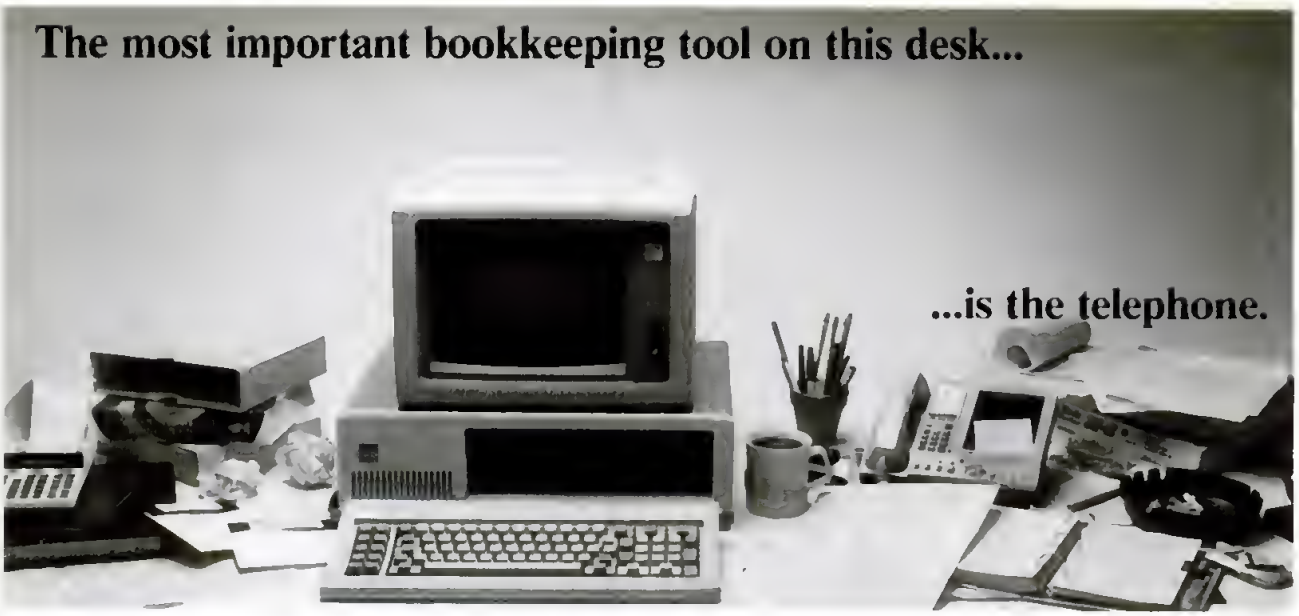
*For Orders, Literature, or Catalogs, Call Us at...*

# 800 PC-BRAND

That's (800) 722-7263. In NY State call (212) 242-3600
PC Brand, 150 5th Ave., New York, N.Y. 10011-4311
Telex: 667962 (SOFT COMM NYK)

©1987 PC BRAND
Prices, terms and specifications subject to change without notice.

CIRCLE 310 ON READER SERVICE CARD




# The Company Books™

## The Software

**The Product:** a bookkeeping program for businesses (or individuals), offering four journals (cash, receivables, payables, and general), multiple budgets, and numerous standard and customized reports; producing simplistic or sophisticated books for any type of organization.

**The Particulars:** A display mimicking a typical ledger page; entering accounts by either name or number; attaching long remarks to any entry; keeping all entries always on file; printing out all entries to any account over any time span.

**The Power:** the fastest, most adaptable, easiest to use bookkeeping program on the market today; entries up to one bundred million, totals up to one billion; single location bookkeeping, or separate locations for special journals (sales, purchases, et cetera).

**The Past:** developing *BOOKS! The ELECTRIC Ledger* (sold through computer stores for more than three years, to thousands of businesses at prices up to $900.00).

**The Prerequisites:** owning an IBM-PC (or the equivalent) having two disk drives, 256K of memory, and DOS 2.0 (or later).

**The Price:** $150 (plus $5 for shipping and handling) for the complete program.

**The Promise:** buy the program and use it for a month (enter up to three months of real data); if not satisfied, return it for a full refund of the purchase price.

# The Company Bookkeeper®

## The Support

**The Product:** a service organization providing direction and suggestions at every step of the way, from purchasing and installing hardware, to performing basic computer operations, to installing a set of personalized books, to making the actual entries, to printing out reports, to making up budgets, and to solving any problems which may arise in the hardware, software, or bookkeeping.

**The Particulars:** prepaying a fee for a fixed amount of service time; calling in on toll-free lines; careful timing of every call; charging only for actual time spent listening and giving answers; using a modem, so we can watch on our screen (and advise), while you work on your books.

**The Power:** enough highly trained, dedicated support personnel (all with formal accounting education), together with more than enough toll-free phone lines, to answer all questions and solve all problems quickly and efficiently.

**The Past:** installing and supporting bookkeeping systems for many years (and acquiring thereby a thorough and abiding understanding of the needs of the business manager).

**The Prerequisites:** owning a registered copy of *The Company Books.*

**The Price:** $175 for the first two and one half hours; $75 for each additional sixty minutes.

**The Promise:** buy the service and use it for a month; if not satisfied, cancel it, and we'll refund one dollar for each unused minute.

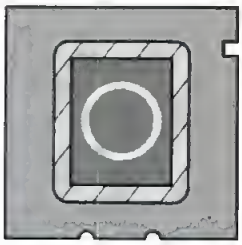
## We guarantee, with our help, anyone can setup and keep your books.

Swiedler Information Systems
8825 Roswell Road, Suite 592
Atlanta, Georgia 30338
**1-800-542-6484**
or (404) 642-6484 (collect)

Registered trademarks: BOOKS! The Electric Ledger-Systems Plus Inc.; IBM-International Business Machines Corporation

CIRCLE 500 ON READER SERVICE CARD

■ GUS VENDITTO



# PC ADVISOR

*Help in optimizing the performance of a hard disk, in maintaining an Eagle PC, in setting the color on a 1-2-3 display, and in speeding up a 6-MHz AT.*

**INTERMEDIATE AT SPEEDUP**

I have run into problems trying to speed up my IBM PC AT, which runs at 6 MHz. I bought an 8-MHz crystal after reading an article in your magazine. However, the machine doesn't function with the new crystal. I've now learned there are three different ATs—one at 6 MHz that can be speeded up with a new crystal, a 6-MHz machine that cannot, and an 8-MHz version.

The company that sold me the crystal now says it has a $175 turbo board that will speed up my AT.

I need complete compatibility with software and need my existing slots, so I'm reluctant to buy a turbo board. Besides, the crystal costs only $11, but if it's going to turn into a $175 project, I don't know whether to proceed.

Claude Mattingly, M.D.
Jasper, Texas

*You're a victim of a particularly nasty trick by IBM. Shortly after the speed demons discovered a simple way to jack up its 6-MHz ATs to run at 8 MHz, IBM quietly changed the BIOS so that newly manufactured versions of the same model would not function at the higher 8-MHz speed. There was no good reason for this surreptitious switch other than that IBM introduced what it considered the proper way to run an AT at 8 MHz, the $5,295 Enhanced AT, several months later.*

*The only hardware speedup for your AT is a turbo board, but it does have the drawbacks you mentioned.*

*I suggest disk-caching software. Two of the best are* Lightning *(Personal Computer Support, Dallas, Tex.; (214) 351-0564; $89) and* PC SuperKwik *(Multisoft Corp., Beaverton, Oreg.; (503) 642-7108; $79.95). More expensive, but part of a disk full of other valuable utilities, is Phoenix Technologies'* Pdisk *(Norwood, Mass.; (800) 344-7200; $195).*

**SAVE THE EAGLES**

Is there a source for upgrading my Eagle PC? I thought I was protected against obsolescence when I bought a PC compatible. But now I find I can't install an EGA without a special kit.

Phil Rosenberg
Pittsburg, Pennsylvania

*I don't know that any new technology will ever be immune to the march of progress, but there is safety in numbers. With Eagle no longer around to support their PCs, new suppliers have emerged.*

*A flock of former Eagle employees has formed Wilkinson Software to provide technical support (some of it free), replacement parts, and upgrades (Wilkinson Software, Westminster, Calif.; (714) 894-3216; (714) 895-1759 for technical support).*

■ *EasyColor for 1-2-3* lets you choose your color from all available colors. It supports CGA, EGA, and *1-2-3*, Release 1A, 2.0, and 2.01.

**BRIGHTENING THE LOOK OF 1-2-3**

I am using *1-2-3*, Release 1A, on an AT with an Enhanced Color Display and a Paradise Autoswitch card. My problem is that the high-intensity green in Lotus's help system and unprotect mode is so brilliant that it appears fuzzy.

How do I get rid of this "high-green" and replace it with white on black or another combination?

Keith Griggs
Houston, Texas

*There's the let-somebody-else-do-the-work method and the roll-up-your-sleeves-and-get-dirty method.* EasyColor for 1-2-3, *from The Binary Workshop (Champaign, Ill.; (217) 359-3400; $49.95, plus shipping), is a simple, menu-driven utility that lets you choose your color from all available colors. It supports CGA, EGA, and* 1-2-3, *Release 1A, 2.0, and 2.01. The company also sells a screen-painting program for* Symphony.

*To do it yourself on Release 1A, dig out a copy of* PC Magazine *from July 9, 1985 (Volume 4 Number 14), and refer to Spreadsheet Clinic, in which everything you need to know about altering* 1-2-3*'s color settings with DOS DEBUG is detailed. For* 1-2-3, *Release 2.0, refer to the*

## ■ PC ADVISOR

*April 29, 1986, Spreadsheet Clinic (Volume 5 Number 8).*

*Debugging the code by yourself works just as well as* EasyColor*—that is, if you don't panic at the sight of DOS DEBUG reducing your expensive application to hexadecimal code and if you're willing to experiment with the colors until you get them just right.* EasyColor*'s major advantage is that you see what you get before you leave the program.*

### THE RIGHT INTERLEAVE

I heard that a hard disk will run faster if I change the interleave. Is this true? How would I go about it?

Wendy Ammerman
Tempe, Arizona

*You can adjust the hard disk interleave to deliver faster performance. In order to set the best interleave, first you'll need to consider the disk controller and head capabilities versus processor speed.*

*An interleave that's too low (3:1 or 2:1) overwhelms the system with too much data, too fast. An interleave that's too high slows down performance because the heads are covering more ground than they should in retrieving every last bit.*

■ You can adjust the hard disk interleave to deliver faster performance.

*IBM traditionally picks a very conservative interleave, so you may be able to make a significant improvement by setting a lower interleave. Also, if you've increased your PC's clock rate, the hard disk is probably ripe for a snappier interleave.*

*Until recently, the only way to reset that value was through IBM's Advanced Diagnostics, and that left you guessing at the optimum value. A new series of utilities,* Htest/Hformat Advanced Hard Disk Diagnostics *(Paul Mace Software, Ashland, Oreg.; (800) 523-0258; $89.95) can evaluate the disk/controller combination and suggest the best setting; then it lets you perform a low-level format with that value for your particular combination of disk and processor. Before you send in your order, you'll have to back up the entire disk before you start: resetting the interleave requires reformatting the disk.*

### ASK THE ADVISOR

Send your questions to the PC Advisor, *PC Magazine*, One Park Avenue, New York, NY 10016. PC


# Meet The New Chairman Of The Board.

**DEVELOPED WITH PC MAGAZINE**

***Chairman***™ is the first true multiuser bulletin board software. Now up to six users can access your bulletin board simultaneously.

**A MULTIUSER BULLETIN BOARD**

❑ Are you tired of using expensive online services as your company's message center? ***Chairman*** can handle all your electronic mail needs at a fraction of the cost, and with a higher level of security.

❑ Do you service your customers' software? Use ***Chairman*** to send new software versions to all current users. ***Chairman*** can also become a clearinghouse for programs and data files. You can upload or download both binary and ASCII files.

❑ Do you have trouble getting customers to fill out questionnaires? With ***Chairman,*** you can conduct fast, effortless electronic surveys. Use the built-in editor to create a list of questions. ***Chairman*** will record user responses for your instant analysis.

We developed ***Chairman*** initially to work on PC Magazine's extremely busy and demanding Interactive Reader Service. ***Chairman*** is written in DMA's powerful ASCOM IV script language—and we include the actual source code, to make customization for your particular needs a snap.

Are you ready to revolutionize your electronic communications? Start at the top—with ***Chairman.***

For more information, contact DMA the leaders in communications software.

DMA

**DYNAMIC MICROPROCESSOR ASSOCIATES, 545 FIFTH AVENUE, NEW YORK, NY 10017 (212) 687-7115**

WE SPEAK YOUR LANGUAGE ®

CIRCLE 330 ON READER SERVICE CARD

# THE AMERICAN FORCE

Total Compatibility

*All across America the word about a new force is spreading. A force that has put American design, technology and manufacturing back on top. Be a part of it!*

*System 1800 Models*

| WAIT STATE | MODEL NUMBER |
|---|---|
| 1 | System 1800-0 (8MHz) |
| 1 | System 1800-A (10MHz) |
| 0 | System 1800-B (10MHz) |

**System 1800 Features:**

- 6/8/10MHz Selectable with 10MHz 80286CPU chip
- Fully compatible IBM AT™ AMI BIOS with built in SET-UP UTILITY. • 47 drive type table. • 48 hour burn-in. • 512K RAM standard expandable to 1MB. • 200 pages of documentation.
- Clock/Calendar with battery backup.
- Hard disk/Floppy Controller.
- UL/CSA approved 195 watt power supply. • Made in U.S.A.. • 1 Year Warranty

*Over 20,000 units installed*

American Quality Manufacturing

U.S. Design and Engineering

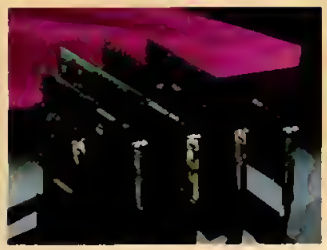
| | | | |
|---|---|---|---|
| **CLUB AT INC.** 800-451-8889 | **QIC RESEARCH INC.** 800-843-0806 | **ELTECH** (408) 943-1764 | **TECHPOWER** (714) 979-1330 |
| **SCSI** 1-800-237-7274 | **S.F. MICRO** 800-237-5631 | **SERVEX** (416) 827-7807 | **PRIDE** (604) 273-0707 |
| **TECH POWER II** (818) 882-6300 | **PEAR TECHNOLOGY INC.** (312) 480-7300 | **KELLECO** 1-312-887-0330 | **UNITED SOLUTIONS** |

System 1800

An OEM Product of Everex Systems Inc.

IBM is a registered trademark for International Business Machine Corporation

# Discover The
## Quality, Features,



### GRAPHICS

**EPGA - Professional Graphics Adapter**

- Compatible with the IBM® PGC
- Fits into a single slot
- Displays 640x480 graphics in 256 colors
- Emulates CGA, Hercules® and MGA modes

**Micro Enhancer**

- Compatible with the IBM EGA
- Supports 640x350 graphics in 16/64 colors
- Half card fits in a short slot
- Emulates Hercules and CGA modes

**Everex Edge**

- Displays 320x200 graphics in 16 colors
- Runs HGA 720x348 monochrome graphics
- Runs Lotus 1-2-3® and Symphony® in 132 columns
- Parallel port and light pen connectors

### STREAMING TAPE

**Excel Stream 20**

**Excel Stream-60**

**Excel Stream 60-8**

- 60MB cartridge Backup
- 20MB cassette Backup
- Automatic Scheduler
- File Restore from Image backup
- Backup across networks
- 5MB/min speed
- Multiple datasets and tapes
- Image and File records on the same tape
- Context sensitive help
- Nestable and movable windows
- Extensive diagnostics
- Easy installation program

### COMMUNICATIONS

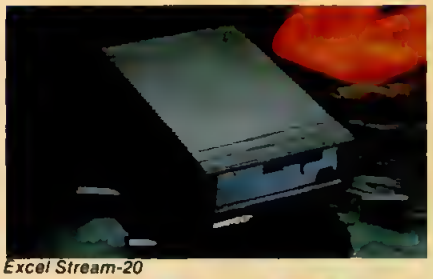
**Evercom 24 Modem**

- International operations at 2400 bps
- Compatible with Hayes® AT command
- Bell 212A/103 and CCITT V.22/V.22bis compatible
- Adaptive equalization
- Automatic answer and voice/data switching
- Phone off-hook detect
- Runs in slot 8 of IBM XT®
- Runs with multi-line phones

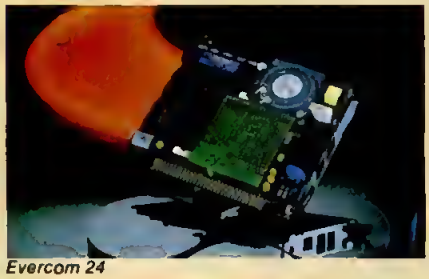
**Evercom 12 Modem**

- 300/1200 bps speed on a short card
- Hayes and Bell 212A compatible
- Supports tone and pulse dialing
- Automatic answer and voice/data switching
- Bitcom software included

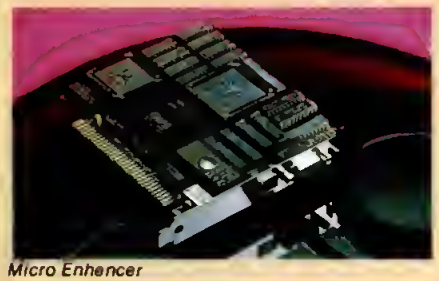
*EPGA*



*Excel Stream-20*

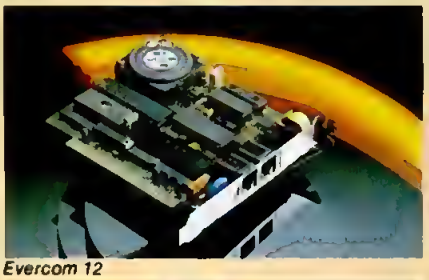


*Evercom 24*

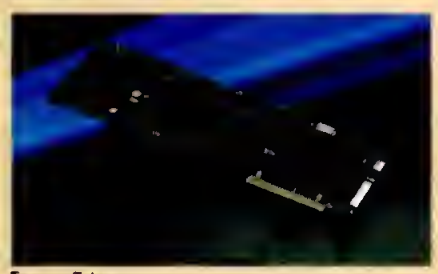


*Micro Enhancer*

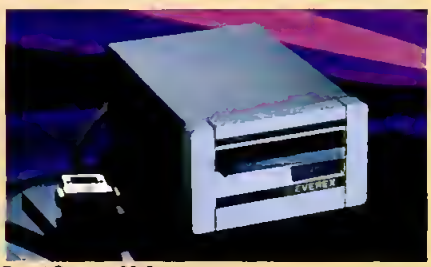
*Excel Stream-60*



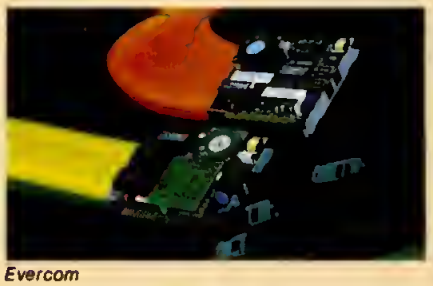
*Evercom 12*



*Everex Edge*




*Excel Stream 60-8*

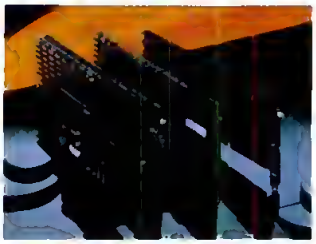


*Evercom*

EVEREX, EPGA, Micro Enhancer, Everex Edge, Excel Stream-60/20/60-8, Evercom 24, Excelerator, RAM-3000, Magic Card 16, and EVER for EXcellence are trademarks of EVEREX Systems, Inc. IBM and IBM AT are registered trademarks and IBM PC and XT are trademarks of International Business Machines Corporation. Hercules is a trademark of Hercules Computer Technology. Lotus 1-2-3 and Symphony are registered trademarks of Lotus Development Corporation. Hayes is a registered trademark of Hayes Microcomputer Products, Inc. UNIX is a registered trademark of AT&T Bell Laboratories, and XENIX is a trademark of Microsoft Corporation. ©1987 EVEREX Systems, Inc. All rights reserved.

# Everex Difference

## Price and Performance.



### MULTIFUNCTION

**Excelerator**

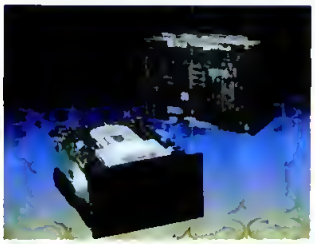
- 80286 8MHz processor replaces 8088 on PC/XT®
- 33% faster than standard IBM AT®
- Add up to 640K of cache RAM memory
- Socket for 80287 math coprocessor

**Magic I/O**

- I/O plus clock/calender
- For XT/AT and compatibles
- Serial ports COM1-COM-4
- Parallel ports LPT1-LPT3
- Software included

**Magic Card 16**

- Up to 2MB of extended memory for AT
- Flexible memory addressing
- Configurable parallel and serial ports



### HARD DISK DRIVES

**Everdrive 20MB External**

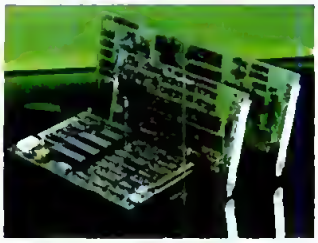
- Half-height, 20MB formatted capacity
- ST-506/ST-412 interface
- 65 msec average access time
- Dedicated head shipping zone

**Everdrive 40MB Internal**

- Half-height, 40MB formatted capacity
- 40 msec average access time
- ST 412 interface
- 20,000-hour MTBF

**Everdrive 72/80MB External**

- 72/80MB formatted capacity
- 30 msec average access time
- 20,000-hour MTBF
- 25-5 Watts power consumption



### OEM PRODUCTS

**EV-826 Tape Formatter**

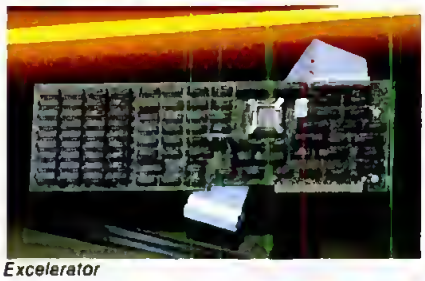
- Onboard 8K RAM for data buffer
- Standard QIC-36 drive interface
- QIC-02 interface for host adapter

**EV-332 Hard Disk/Floppy Controller**

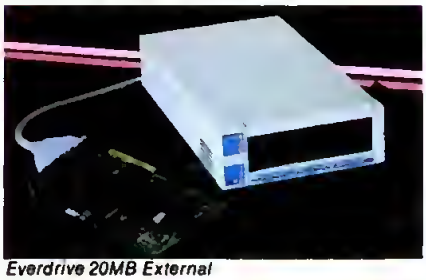
- Reduced height
- ST506/412 interface supports 2 hard drives
- 2:1 interleave factor
- 32 bit ECC
- Supports 2 floppy drives

**EV-1800 AT Mother Board**

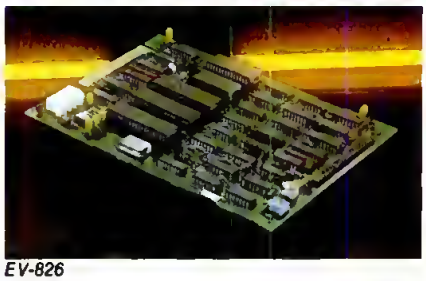
- 10MHz zero wait state 80286 CPU
- 512K RAM, expandable to 1MB
- Six 16-bit and two 8-bit slots
- I/O ports and clock calendar



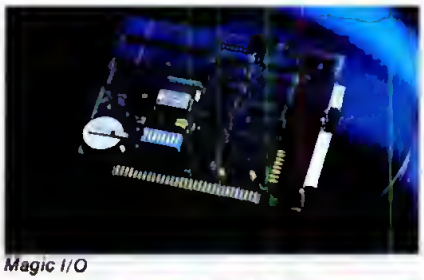
*Excelerator*



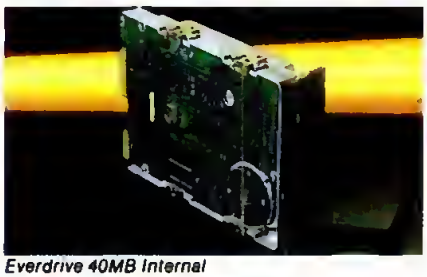
*Everdrive 20MB External*



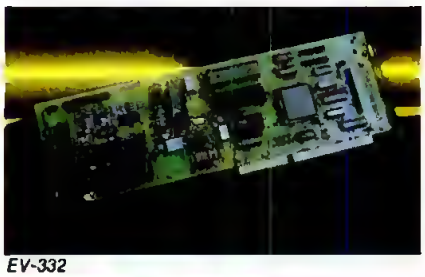
*EV-826*



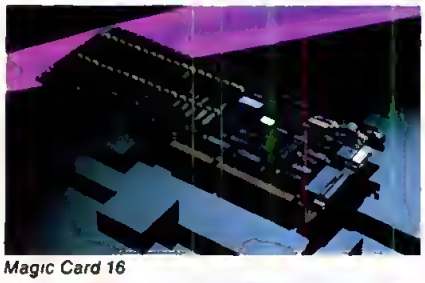
*Magic I/O*



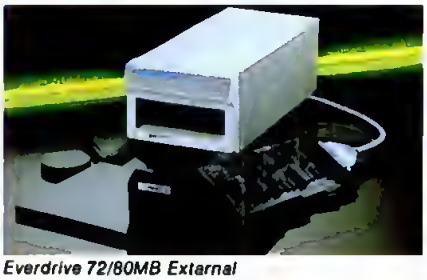
*Everdrive 40MB Internal*



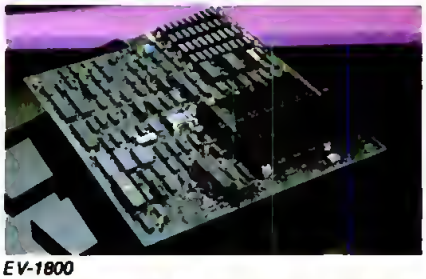
*EV-332*



*Magic Card 16*



*Everdrive 72/80MB External*



*EV-1800*

EVEREX
EVER for Excellence

48431 Milmont Dr. Fremont, CA 94538
415-683-2100 1-800-821-0806 (U.S.) 1-800-821-0807 (in CA)

CIRCLE 194 ON READER SERVICE CARD

# HAUPPAUGE

## Thrust your math into high gear!

**HAUPPAUGE** has a hunch you need faster math calculations. So we've launched our 287 FaST10—the highest speed math coprocessor available for PC/AT's and all AT compatibles.

Now you can speed up your math calculations without worrying about data safety. Our FaST10 has a self contained high speed clock that speeds up math coprocessor operations without jeopardizing accuracy.

The FaST10 accelerates programs including 1-2-3, Framework, AutoCAD and Symphony (to name just a few)—by as much as 250%!

Our FaST10 is compatible with: 6 or 8 MHz IBM PC/AT's, the Compaq DeskPRO 386 and all 286-based PC's like the Compaq DeskPRO 286 & Portable 286.

***We have all the Coprocessors you need!***
FaST modules, which operate at full speed, for the PC/AT, Compaq DeskPRO 386 and PC/AT compatibles:

**287 FaST 10**—full speed 10MHz ..... **$469**
**287 FaST 8**—full speed 8 MHz ..... **$379**
**287 FaST 6**—full speed 6 MHz ..... **$249**

Math coprocessors for AT compatibles and accelerator cards:

**287-10 Chip** ..... **$439**
**287-8 Chip** ..... **$349**
**287-6 Chip** ..... **$219**

Math coprocessors for PC/XT's & higher speed compatibles:

**87 Chip**—4.77 MHz ..... **$129**
**87-2 Chip**—8 MHz ..... **$195**

***Software for Math Coprocessors.***
Scientists, business professionals, engineers and developers have made Hauppauge software products best sellers!

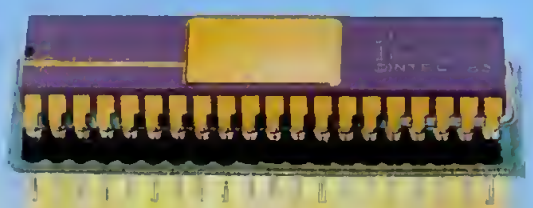
**87 QB Pak**—Math coprocessor support for Microsoft QuickBASIC versions 1 and 2, and the IBM BASIC Compiler ..... **$69**

**87 Software Pak**—Math coprocessor support as in the 87 QB Pak, and also includes a set of high speed Matrix and FFT routines and complete source code! ..... **$180**

**HFT+**—High speed one and two dimensional array FFT's for all Microsoft languages ..... **$125**

**Math Toolbox**—Full screen scientific calculator for students with built-in math and statistical functions .... **$49**

***Give your PC a boost to boast about!*** Contact your local PC dealer or VAR for information about Hauppauge math coprocessor products. Or call us for our free math coprocessor booklet, "87 Q's and A's."



Hauppauge
*Your math coprocessor specialists*

**Hauppauge Computer Works, Inc.**
358 Veterans Memorial Highway,
Commack, N.Y. 11725
Phone: 516-360-3827

Trademarks: QuickBASIC Microsoft Calculus AI Ware, HFT+ TechWare, MathTOOLBOX Syntel Labtech Notebook Laboratory Technology Corp., PC and PC/AT IBM Corp

CIRCLE 276 ON READER SERVICE CARD

PC MAGAZINE

# FIRST LOOKS

# BASIC Wars Heat Up; Microsoft Strikes Back

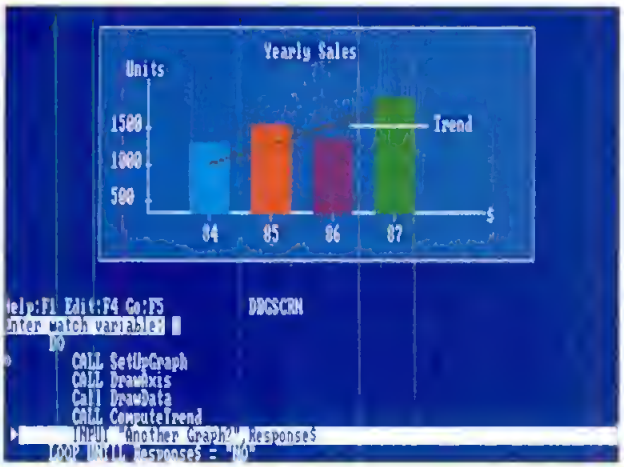
PC HANDS ON

BY ETHAN WINER

In a direct response to Borland's new Turbo Basic (see First Looks, page 33, Volume 6 Number 5), Microsoft Corp. has made a number of important enhancements to QuickBASIC with Release 3.0.

Most notable are support for a numeric coprocessor, a greatly enhanced debugging mode, and several new additions to the language itself.

The company has also corrected an infuriating conflict that caused a total crash in Release 2.0 if resident keyboard handlers were invoked from within QuickBASIC's editor.




*The QuickBASIC debugger constantly displays the value of a "watch" variable you specify. Your program controls the attributes of the debugging screen.*

Besides cooperating with TSRs, the editor now offers an overstrike mode, which is greatly appreciated, as well as full compatibility with the 43-line EGA text mode. BASIC programs can also put an EGA into that mode with a new option to the WIDTH command.

In order to maintain compatibility with programs compiled by older versions of QuickBASIC and BASCOM, Microsoft has added new forms of the floating-point conversion functions.

Under Release 3.0, CVS,

*(continues on page 34)*

# 4Word Brings Word Processing Inside the Range of Lotus 1-2-3

PC HANDS ON

BY GUS VENDITTO

*4Word* will appeal to almost every *1-2-3* user who's occasionally found it difficult to get out of bed in the morning.

Part of a new software genre, *4Word* is the first word processing add-in for *1-2-3*. Rather than ask that you spring from your warm cocoon into a cold world, *4Word* lets you languish in the comfortable environs of your familiar spreadsheet, even when it's time to present your work to the outside world.

With *1-2-3* (Release 2.0 or later) running, *4Word* is called by an Alt–function key combination of your choosing and provides a healthy selection of word processing services for the spreadsheet then active, plus mail-merge capability.

In one sense, the program merely enhances *1-2-3*'s Edit (F2) key for left-aligned labels only (the program will not touch numbers, formulas, or non-left-aligned labels): just one spreadsheet column can be edited at a time. But because *4Word* does offer margin settings, word wrap, and text enhancements, that column can hold a fairly complex document that can easily be used to annotate just about any spreadsheet file.

This close relationship between *4Word* and *1-2-3* makes the word processor seem like a part of *1-2-3* and gives you fast access to text-enhancing features. But as will happen in any tight living quarters, there are times when the programs seem to be fighting for space.

*4Word* documents reside in a live worksheet column, so that the text of the document is also live data to *1-2-3*. This situation threatens the column and row structure of any data not declared off-limits by *4Word*'s Settings Restrict Range command. You will have to learn

(continues on page 35)

## HANDS-ON INDEX

**DRAGNET**
Searches files through *Microsoft Windows* ..... 36

**VOPT**
Optimize any hard disk for $49.95 ..... 36

**EMERALD DOS-2010 CASSETTE TAPE BACKUP**
Half-height backup ..... 38

**AUTOSWITCH EGA 480 CARD**
Paradise's latest ..... 43

**BAS2PAS**
Shareware for multilingual programmers ..... 43

**dBXL**
Undercuts *dBASE* ..... 46

**GRIDLITE**
A $1,795 laptop ..... 48

## QuickBASIC 3.0

(continued from page 33)

MKD$, and so on, now convert values based on the IEEE numeric format required by the 8087/80287, rather than using Microsoft's proprietary scheme as before.

Existing data files may still be read using new forms of these functions, or a command line option will do this for you automatically.

In an addendum to the QuickBASIC manual, a sample program is given that shows how to convert a file to the new format permanently.

Also, 8087 emulation is available for improved accuracy when a coprocessor is not installed.

For standalone programs, this is accomplished by linking a separate object file with the main program. Then at run time, the program can determine whether or not an 8087 is installed and available.

But one of the most exciting new features is an enhanced debug mode that allows setting program breakpoints, as well as letting you constantly monitor the value of a variable. Rather than having to insert STOP statements manually into your program and then recompile, up to eight breakpoints may be specified from within the debugger. Of course, this works only in the Release 3.0 environment.

Whenever an error is encountered in a running program, or if Ctrl-Break is pressed, a message appears at the bottom of the screen.

Pressing Enter then starts the debugger, or you may push the Spacebar to reenter the editor as before. Once the debugging mode is started, a number of new and useful options are available.

Similar to Release 2.0, a window appears that lets you display your source program, and the statements may be executed either one at a time, or in a slow-motion mode that Microsoft calls "animated."

> One of the most exciting new features is an enhanced debug mode that allows setting program breakpoints, as well as letting you constantly monitor the value of a variable.

The window may be made larger or smaller, scrolled up-/down or sideways, and a help key shows all of the many options.

It's a good thing, too, since the debugger uses a curious combination of function keys, Alt-keys, and Ctrl-keys that is not particularly intuitive.

### Watch Variables

However; the real gem is what Microsoft refers to as "watch variables." Pressing F2 prompts you for the name of a variable to monitor, whose value will be constantly displayed within the window. Although only one variable can be shown at a time, you can select different variables as often as needed, without having to recompile.

Several new statements have also been added, as well as new options to a few existing commands.

CLS 2 lets you clear all but the bottom line of the display, CONST adds the capability to use string or numeric constants where appropriate, and several new loop control commands have been added.

DO WHILE/UNTIL and LOOP WHILE/UNTIL now let you check the condition of a variable either at the beginning or the end of a control loop.

Also, EXIT DO and EXIT FOR commands have been added that allow a program to exit those structures more gracefully, as well as a stripped-down form of SELECT and CASE.

Where Turbo Basic allows a variable as part of a CASE comparison, QuickBASIC, Release 3.0, accepts only hard-coded constants.

This is a shame, because the whole point of SELECT and CASE is to eliminate a lot of the repetitive IF/THEN/ELSE testing.

All in all, Release 3.0 provides a number of meaningful improvements, and it will be interesting to see how Borland responds.

### PC MAGAZINE FACT FILE

***QuickBASIC*, Release 3.0**
Microsoft Corp.
16011 NE 36th Way
Box 97017
Redmond, WA 98073
(206) 882-8080
**List Price:** $99; upgrade from Release 2.0, $15; upgrade from Release 1.0, $30.
**Requires:** DOS 2.0 or later
**In Short:** An enhancement to Release 2.0 that adds greatly improved debugging, including the ability to monitor a single variable during execution and coprocessor support. Not copy protected.

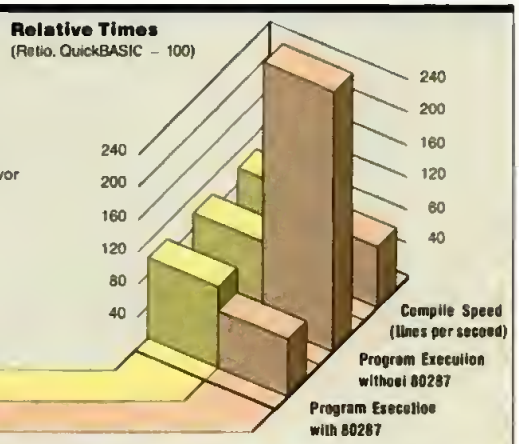
CIRCLE 435 ON READER SERVICE CARD

### PC LABS — Benchmark Tests: Microsoft's QuickBASIC 3.0 vs. Borland's Turbo Basic

The tests were run on an 8-MHz IBM PC AT. In the individual routines, QuickBASIC was about 10 percent to 200 percent faster in all operations except some string conversions and manipulation functions. QuickBASIC is even faster for the common string functions. These tests are weighted in favor of floating point operations.

**Performance Times**
(Times given in seconds except where noted)

| Product | Program Execution with 80287 | Program Execution without 80287 | Compile Speed (lines per second) |
|---|---|---|---|
| QuickBASIC | 604 | 743 | 150 |
| Turbo Basic | 480 | 2,156 | 200 |




The **BASIC Execution** benchmark test is a processor-bound program that executes a set of integer, floating-point, and string operations. Both versions were compiled with and without numeric coprocessor support. The overall execution time is presented to give a simple comparison of compute-bound performance.

The **Compile Speed** test shows the rate at which the compiler creates an executable program for debugging in the interactive mode. Creation of an .EXE file takes longer. However, an .EXE is normally created once after the program is running properly.

## 4Word

(continued from page 33)

fast how to protect the numeric sections of your spreadsheets or soon see the spreadsheet's carefully aligned relationships destroyed by a casual carriage return.

All of the printing is handled by *1-2-3*, so any *4Word* column that is longer than the *1-2-3*–defined column width may disappear behind neighboring cells when the document is printed. *4Word* also will not prevent you from creating lines longer than *1-2-3*'s margin setting, a discovery you may make after the document is printed with a neat trim down the right side. It's simple enough to expand the print margins, but *4Word* makes it far too easy to create documents too wide for your current settings.

Within those limitations, regular *1-2-3* users will find a bushel of exciting new features virtually droppped in their lap. Once *4Word* has been invoked, the F10 key (shades of *Symphony*) calls the point-and-shoot menu, which can access all of the program's features, including search and replace and paragraph; F1 calls a help index and an oversize diagram of the function key assignments.

Not only does *4Word* spare you from the tedious routine of saving a *1-2-3* file that you want to annotate as an ASCII PRN file and then calling it into your word processor (where either your formulas or values are lost), it lets you create documents around your figures and formulas. If you use the Integrate Link function, your report can have a "hot link" to the spreadsheet that lets you shuttle between worksheet and document, changing figures and keeping the document up to date.

This sort of dynamic interaction is likely to make the program an everyday tool for tinkering with *1-2-3* files. The manual gives you valuable tips on how to make the most of the program (suggesting time-saving macros) and how it works (pointing out where the program is monkeying with *1-2-3* commands).

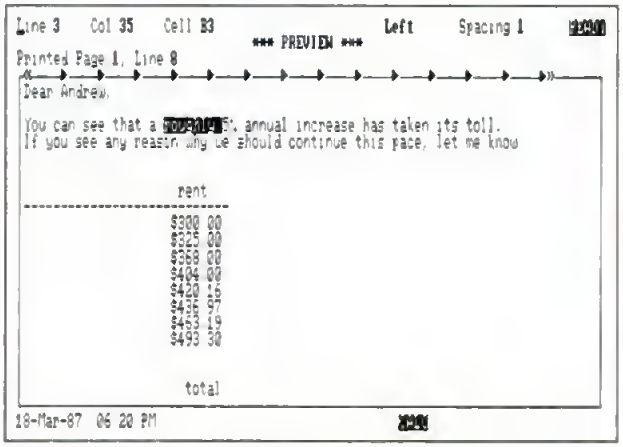
It even shows you how to add print attributes (bold, underline, strike-through) to spreadsheet cells untouched by *4Word*. Because the word processor alters *1-2-3*'s SET configuration file upon installation, *1-2-3*'s print drivers understand *4Word*'s text formatting commands.

*4Word* has full *1-2-3* macro compatibility, so routine letters, even form letters, can be automated with macros.

Owners of enhanced keyboards may once again find themselves aching for the old, unimproved models. *4Word* and all of the *1-2-3* add-ins to follow (including at least two more word processors) make heavy use of the Alt-Function key combinations—finger-stretching exercises most suited to piano students.

And although *4Word*'s menu and command structure is intelligently designed, logic may have been taken to an extreme in using the finger-twisting combinations of End–Right Arrow, End–Left Arrow for line right and left manuevers.

*1-2-3* macro programmers, or anyone who reviews someone else's *1-2-3* files, will find it a major time-saver. Those who print mailing labels from spreadsheet data, will find it's an outright blessing. Anyone who's ever used Lotus's *1-2-3 Report Writer* for similar tasks will probably want to, at long last, burn the *Report Writer* disks and manual and dance on the ashes.




*This 4Word document was created in column B of a spreadsheet, so a row of figures also in column B is seen, but the total, in column C, is not. The reverse type on the word roughly indicates italics.*

### PC MAGAZINE FACT FILE

*4Word*
Turner Hall Publishing
10201 Torre Ave.
Cupertino, CA 95014
(800) 556-1234
(800) 441-2345 (in Calif.)
**List Price:** $99.95
**Requires:** 320K RAM; *1-2-3*, Release 2.0 or later.
**In Short:** A word processor that runs under *1-2-3* and works only as an active spreadsheet file.
Not copy protected.

CIRCLE 440 ON READER SERVICE CARD

## Feathering the 1-2-3 Nest

*4Word* is only the beginning of what promises to be quite a parade. Over the next year, many companies will introduce *1-2-3* add-ins to combine your workhorse spreadsheet with a word processor, statistical forecaster, linear programmer, linear accelerator—you name it.

For people who live in *1-2-3* and think DOS itself should have columns and rows, it will be Christmas all year long.

Apparently, Release 2.0 and 2.01 of *1-2-3* were designed from the beginning to take add-ins. Lotus Development Corp. delayed distribution of *1-2-3* add-in design kits because it hoped more users would move to *Symphony*, which could always handle add-ins. Most spreadsheet jockeys didn't hudge from *1-2-3*, though, so Lotus bowed to the inevitable.

### Symphony's Finale?

Pretty soon, instead of buying *Symphony* and getting the standard bundle that Lotus thinks you need, you will be able to pick the *1-2-3* add-ins that suit you perfectly. If I were a dealer I might not bother to restock *Symphony*.

Add-ins run under an add-in manager that you plug into your *1-2-3* driver set. So far, all the add-ins I know of run happily under the same manager. However, don't be surprised if, before too long, you hear about beefed up add-in managers that boast "perfect upward compatibility" with the old ones. Be skeptical of perfect compatibility.

It's not inconceivable that you could get stuck with add-ins that won't run under the same manager.

However, assuming that the add-in family stays well behaved, it will only add to *1-2-3*'s dominance of the spreadsheet market. Who's going to buy *SuperCalc* if it can't run the slick add-ins that everyone's shouting about? Lotus's competitors, as well as add-in makers, are already thinking about how to bridge the gap.

Apparently, it's no harder to imitate *1-2-3*'s add-in interface than it is to copy its user interface. Before too long, you might be able to run *1-2-3* add-ins without buying *1-2-3*.

***—Jared Taylor***

# Dragnet Utility Searches Files, Retrieves Data Within Windows

PC HANDS ON

BY M. DAVID STONE

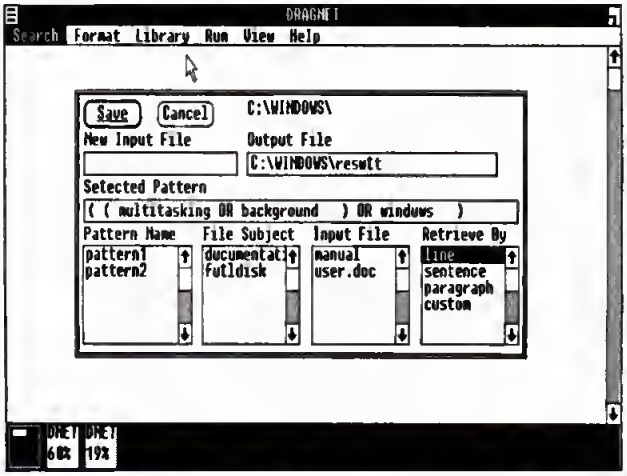
Access Softek bills *Dragnet* as a text management program, a description that may be too vague to be meaningful. What *Dragnet* actually does is provide sophisticated search and retrieval functions for virtually all the text files on your disk. Its function is similar to Zylab's *Zylndex*, but *Dragnet* is one of the first programs to take advantage of *Microsoft Windows*' multitasking capabilities.

The obvious use of *Dragnet* is to find "misplaced" information. It can find all letters dated June 1986 or all uses of a particular word in a selected group of files scattered across a disk.

A more sophisticated application is to use *Dragnet* to find related chunks of information and paste them together. If you're researching photography, for example, and you have several files of notes, *Dragnet* can find the word *lens* and copy the paragraphs that contain it. The resulting file will include most of your notes on lenses.

*Dragnet*'s search capabilities are both sophisticated and easy to use. The default search mode is case insensitive and will accept partial hits. This means that *lens* will match *Lens*, *lens*, *lensing*, and *lenses*. You can also narrow the search, link key words with AND, OR, or NOT and use other advanced features.

*Dragnet* comes with the window dressing you might expect: pull-down menus and pop-up dialog boxes. It is packaged with a run-time version of *Windows* but is better used in the full *Windows* environment. Unlike *Zylndex* and other programs that index your files and search only the indexes, *Dragnet* searches the actual files. This saves you from having to reindex each time you change a file, but it takes time; in one test, it took about 3 minutes to search 16 files totaling 217K bytes—a good reason to use *Windows*' multitasking capability.




*Dragnet's dialog box shows the search pattern, input files, and output files. Two icons are running more searches and showing they are 60 percent done and 19 percent done.*

At the introductory price of $145 (through at least the end of May 1987), *Dragnet* is worth consideration by almost anyone with a hard disk. If your most-valuable information always seems to be out of reach, it could be an invaluable tool. PC

PC MAGAZINE FACT FILE

***Dragnet***
Access Softek
3204 Adeline St.
Berkeley, CA 94703
(800) 222-4020
(800) 445-6966 (in Calif.)
**List Price:** $145
**Requires:** 256K RAM; two disk drives; Hercules monochrome graphics card, CGA, or EGA; DOS 2.0 or later. Hard disk and mouse recommended.
**In Short:** A research utility that can search for simple text strings or series of strings. Runs under *Microsoft Windows*. Not copy protected.

CIRCLE 426 ON READER SERVICE CARD

# VOPT Puts Files in Order Fast

PC HANDS ON

BY GLENN HART

Not many DOS users remember the old days of microcomputing, when the primitive operating systems of the day required you to define how big a disk file would be when the file was created. The disk space you thus allocated was inflexible and permanent. DOS, on the other hand, allocates file space dynamically; when you erase a file, the space it occupied is returned to a pool of available locations for newer files.

One disadvantage is that files can be fragmented and scattered widely over the disk, usually if DOS routes portions of a file to small chunks of available space. When you use such a file, your disk drive has to jump around to retrieve your data. This takes time, and disk access can be noticeably slowed if you have many such fragmented files.

You can correct this and ensure that your files are contiguous by copying everything to a backup, formatting, and then restoring. This is tedious and time consuming, but fortunately there are several utilities that defragment a hard disk automatically. Most take quite a while to operate, and some have problems with certain types of copy protection that mess around with the structure of a disk.

*VOPT*, a new disk defragger from Golden Bow Systems, is something of a miracle. It performs its disk reorganization chores in seconds, instead of the minutes and even hours some other utilities can take. A sexy symbolic display shows the files being moved around on the disk, and informative tallies provide useful information on disk utilization. On a 140-megabyte system partitioned into six logical drives, the initial *VOPT* reorganization took a few minutes. Thereafter, the program never took more than 15 or 20 seconds per drive, even after heavy file activity. We encountered no problems with protected files.

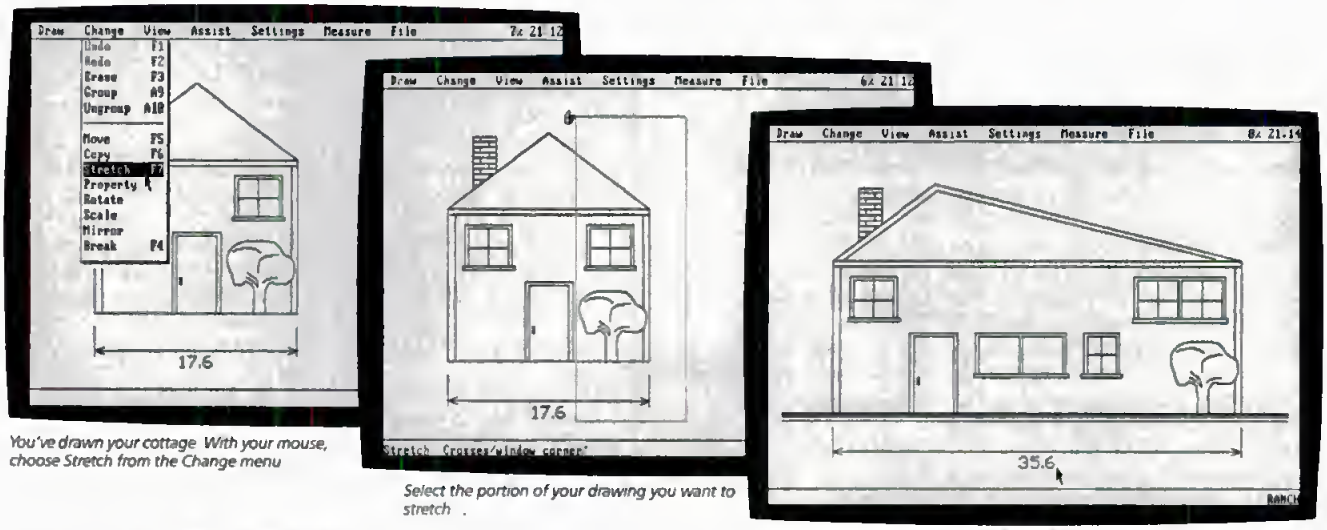
Golden Bow also includes several useful utilities to check floppy disk speed, report hard disk access times, speed up screen writes, and more. The entire package sells for only $49.95, and that's a bargain. *VOPT* is fast, safe, effective, and even fun to use. What more could you want? PC

PC MAGAZINE FACT FILE

***VOPT***
Golden Bow Systems
2870 Fifth Ave., #20t
San Diego, CA 92103
(619) 298-9349
**List Price:** $49.95
**Requires:** DOS 2.0 or later.
**In Short:** A fast, easy-to-use disk-optimizing program. Not copy protected.

CIRCLE 421 ON READER SERVICE CARD

# Turn Your Cottage into a Ranch House for $79.95. With AUTOSKETCH™




*You've drawn your cottage. With your mouse, choose Stretch from the Change menu.*

*Select the portion of your drawing you want to stretch.*

*Move the pointer, click, and the job's done. (The dimension changes automatically.) Add the finishing touches, and your ranch house is complete.*

Only five years ago, computer-aided design was affordable only by the very largest companies. Then came AutoCAD®, which brought CAD to the personal computer, and to the desktops of more than 60,000 architects, engineers, and designers.

But what about you? Are you one of the tens of millions of others who draw? At home: laying out your office, designing your dream house, or making carpentry plans. At work: making facility layouts, assembly instructions, shop-floor setup diagrams, and inspection checklists. Or at school: learning the principles of drawing and design.

You're probably still drawing the hard way—by hand. You can't justify the price of a full CAD system, nor do you want to spend the time to master a system with the complexity and power demanded by a full-time professional. Now, there's a computer-aided design tool for you.

## Introducing AutoSketch

AutoSketch is full-function computer-aided design software for creating line art. You draw with a mouse, using pull-down menus and dialogue boxes. If you're like most AutoSketch users, you'll be drawing in less than an hour. Your drawings will be far more accurate, and you'll spend less time creating them. With AutoSketcb, you can revise a drawing and make a new clean copy in seconds: no more erasure marks or redrawing the final version.

## A New Way To Draw

AutoSketch automatically draws lines, arcs, circles, polygons, and smooth curves. You can add text of any size. You can build libraries of frequently used symbols, draw in colors, and use differing line types to distinguish objects. You can even draw on multiple layers and look at them in any combination.

## Freedom to Experiment

Once you've drawn something, you can move, copy, rotate, mirror, and erase until it's just right. You can work on objects as a group, or break groups apart. Change your mind? You can Undo anything you've done. Change your mind again? Use Redo and put it back.

## Accuracy You Can Count On

AutoSketch drawings are precisely dimensioned, with an accuracy of more than six decimal places. You can have AutoSketch dimension your drawings just by pointing to the distances to be measured. When you scale or stretch the drawing, the dimensions change automatically. You can "zoom in" to work in detail, then "zoom out" to see the whole picture. AutoSketch even allows you to measure angles and areas, so you'll know how much carpet to buy for that new room you're planning.

## Make A Hard Copy Easy

When your design is done, you can make a paper copy on any one of a large selection of printers and pen plotters. And you can print any section of your drawing as well, at any scale you like.

## Enhanced Speed

If you have an 8087 or 80287 math coprocessor, you can run AutoSketch as mucb as three times faster. With the enhanced version of AutoSketch, which requires a math coprocessor, you can experience up to nine times the speed, and for a price — $99.95 — that isn't nine times higher.

If, over time, you want to go further with computer-aided design, you can move on to AutoCAD 2.5 and take your AutoSketcb drawings with you—they're fully compatible.

Find out for yourself why so many professionals draw with computers. If you have a PC, you can enter the age of computer-aided design for just $79.95. Why wait? For the name of an authorized dealer near you, call 800-445-5415. Or simply order direct with a credit card by calling **800-772-9200, ext. 343.**

**AUTOSKETCH™**

**from the Makers of AutoCAD**

**Autodesk, Inc.**
**2320 Marinship Way**
**Sausalito, CA 94965**

AutoSketch runs on IBM PC, XT, and AT PCs and 100% compatibles. We recommend 512K RAM minimum and two floppy disk drives or one floppy disk and a hard disk. AutoSketch supports the Hercules™ Graphics Card, the IBM Color Graphics Adaptor (in monochrome mode), or the IBM Enhanced Graphics Adaptor with 256K graphics memory and the Enhanced Graphics Display. You can use the Microsoft® mouse (or compatible), or a joystick as your pointing device. For compatible printers and plotters, call 800-445-5415.

IBM PC, XT, and AT are trademarks of International Business Machines Corporation.

DON'T MISS AUTOCAD® EXPO '87, JUNE 24-26 WASHINGTON, D.C. CONVENTION CENTER

CIRCLE 164 ON READER SERVICE CARD

# Emerald Tape Backup: Speedy Hardware, Lackluster Software

PC HANDS ON

BY MITT JONES

The Emerald DOS-2010 Cassette Tape Backup internal unit will tuck away your precious files as fast as your system can feed them through.

Aimed primarily at 286 and 386 users, the half-height unit quietly stores up to 50 megabytes of data file by file on audio-size cassettes.

Emerald Systems Corp. claims a backup rate of 2.5 to 3 megabytes per minute, including read-after-write error detection. Our test unit failed to match that rate, but it proved to be among the fastest tape units PC Labs has tested. Running in a Compaq Deskpro 386, the 2010 stored nearly 19 megabytes of hard disk storage in less than 10 minutes, at a rate of 1.9 megabytes per minute. The complex structure of the test data accounts for at least part of the difference in backup rates.

But the 2010 is a prime example of a beautiful piece of hardware hampered by mediocre software—Emerald's *ASP*.

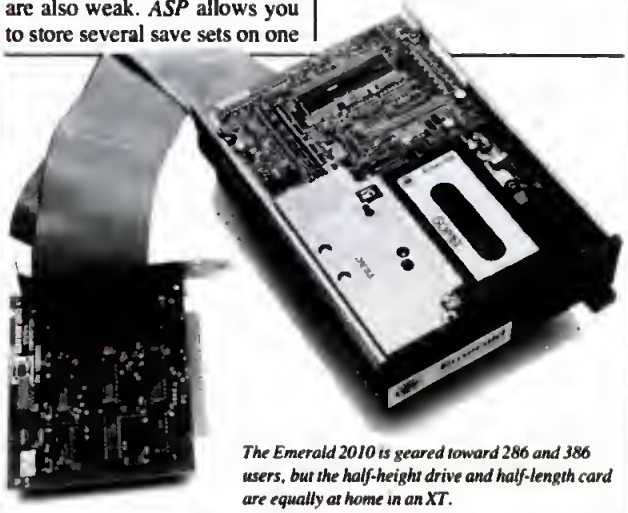
*ASP* is easy to learn and use; you can back up all files or only selected files; and the backup screen shows at a glance what files are being stored and what percentage of the backup is complete. But *ASP* falls short in power and flexibility.

You can put *ASP* in time mode to run batch file at a specified time, but *ASP* takes over your system while it waits for the time you specified.

*ASP*'s Directory functions are also weak. *ASP* allows you to store several save sets on one tape, but listing the save sets can be an exercise in frustration: the unit has to search the nine-track serpentine tape for each save set's header and on one occasion it failed to find a save set.

The *ASP* Maintenance function, which allows you to check the integrity of your tape, simply does not work because of an apparent oversight. Emerald reports that this problem has been corrected.

The 2010 and its half-length controller card are relatively easy to install, though I had to remove the brackets on each side of the unit and turn them upside down to get the unit to slide into the bay. The otherwise clear instructions failed to mention this.



*The Emerald 2010 is geared toward 286 and 386 users, but the half-height drive and half-length card are equally at home in an XT.*

Despite its software deficiencies, the 2010 is a state-of-the-art cassette unit that makes backing up your disk files simple and extremely fast. A more powerful version of *ASP* would make the product ideal.

Emerald also offers the 13010, an external version of the 2010, for $1,295, and configurations that support Novell NetWare and Xenix are also available. PC

PC MAGAZINE FACT FILE

**Emerald DOS-2010 Cassette Tape Backup**
Emerald Systems Corp.
4757 Morena Blvd.
San Diego, CA 92117
(619) 270-1994
**List Price:** $995
**In Short:** An impressive high-speed internal tape backup unit—despite its mediocre software.

CIRCLE 436 ON READER SERVICE CARD

# GSI Pascal Debugs Turbo Code

PC HANDS ON

BY STEPHEN RANDY DAVIS

Borland International's Turbo Pascal spurred thousands of programmers to switch to its fast-executing environment, yet for all the programming assistance Borland's implementation provides, source-level debugging is lacking.

GSI Transcomm has the solution for Turbo users who would rather debug at the program level than pick through Turbo's machine code output.

Rather than working with Turbo directly, GSI's debugger, *GSI Pascal*, has its own integrated compiler that the company categorizes as "totally Turbo Pascal compatible." Tests revealed that GSI Pascal occasionally gave errors on code that Turbo handled without complaint; however, these errors were easily corrected.

*GSI Pascal* uses a window-oriented, menu-type interface. Context-sensitive help is available with the F1 key. After selecting the file to be debugged by either typing its name or pointing at it in a list, you compile it by pointing at Compile and hitting Enter. Operation is similar to that of Turbo Pascal: the first compilation error halts the compiler and throws you into the editor with the cursor placed at the point of infraction.

Once compilation of the program is successful, you enter the debugger. Two windows then open: one with the available debug commands, and the other with your source code. The GSI Pascal debugger can single step, "go to line number," and set permanent break points. Conditional break points are not allowed, but "break on nth time through" is. GSI can access and modify program variables, as well as all of the PC's memory.

Unlike some window environments, GSI's interface has been highly polished to allow quick debugging.

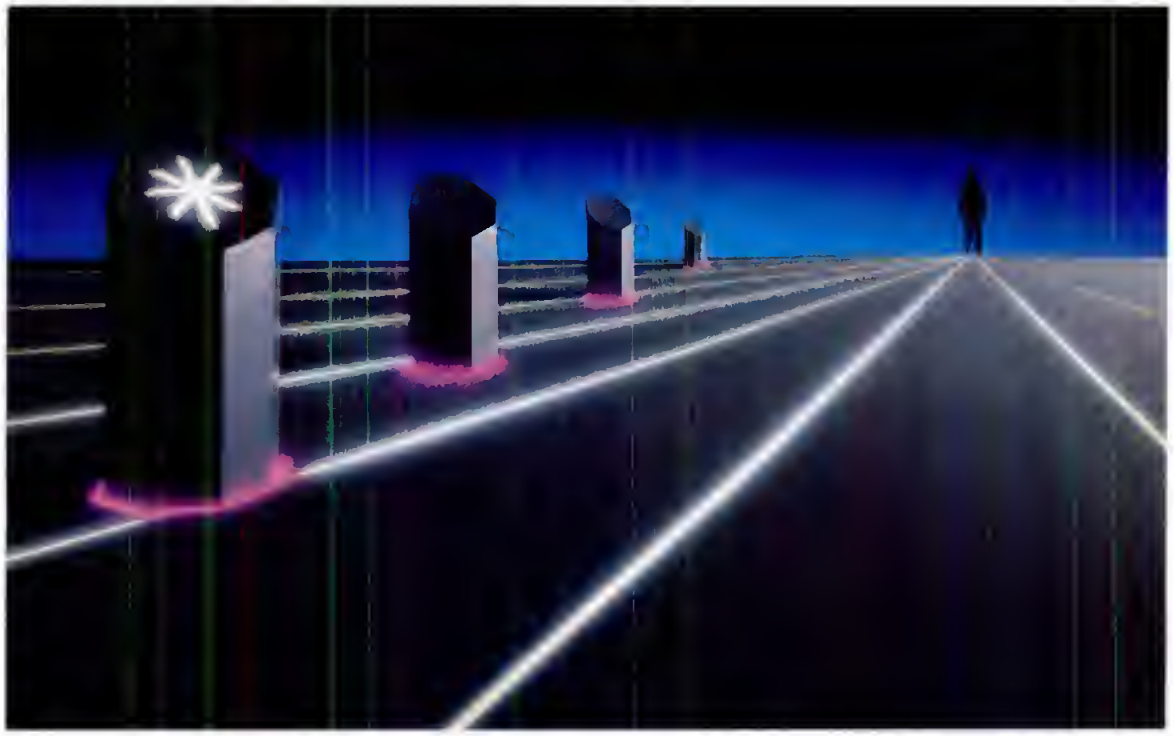
I found *GSI Pascal* to be a wonderful programming tool, with my only reservation being the question of total Turbo Pascal compatibility. PC

PC MAGAZINE FACT FILE

***GSI Pascal***
GSI Transcomm
1380 Old Freeport Rd.
Pittsburgh, PA 15238
(412) 963-7270
**List Price:** $79.95
**Requires:** 256K RAM, Turbo Pascal, DOS 2.0 or later.
**In Short:** A well-conceived, windowing debugger that's compatible with Turbo Pascal. Not copy protected.

CIRCLE 424 ON READER SERVICE CARD

# Communication keeps you a step ahead.



## poly-STAR®. The next step in PC to VAX communication.

Evolution is a series of small steps, rather than a quantum leap. Today's hero becomes a stepping stone to tomorrow's technology.

Poly-STAR software has taken that next step. The poly-STAR package is enhanced, extremely accurate, DEC-oriented communication software for IBM PC's and compatibles. It incorporates all the industry-leading features of poly-COM/220 and poly-COM/240 software and adds many more for even higher levels of communication capability.

**How the best just got better.**

A series of small steps leads to the next generation. Here's a brief sample: "Soft" (remappable) keyboard, pop-up window menus, "hot key" switching, international keyboard support, user defined translation of characters, enhanced remote control features including error-free file transfer, "smart" modem support, a "phone book" feature, powerful user-programmable communication language, pre-written communication scripts for automated logon, file transfer, disk backup and mail delivery.

**With more to come:** Ethernet (LAT) support, including simultaneous sessions, is now in beta test. Additional network support is in development.

Poly-STAR software, priced from $200, is also fully compatible with poly-XFR and poly-SHARE software. Upgrades for poly-COM/220 and poly-COM/240 software are available.

If you're going to maintain a competitive edge, you need communication technology on the leading edge. You need poly-STAR. To order or to receive additional information, call or write the Polygon Sales Department today. Polygon, Inc., 1024 Executive Parkway, St. Louis, MO 63141, **(314) 576-7709.**

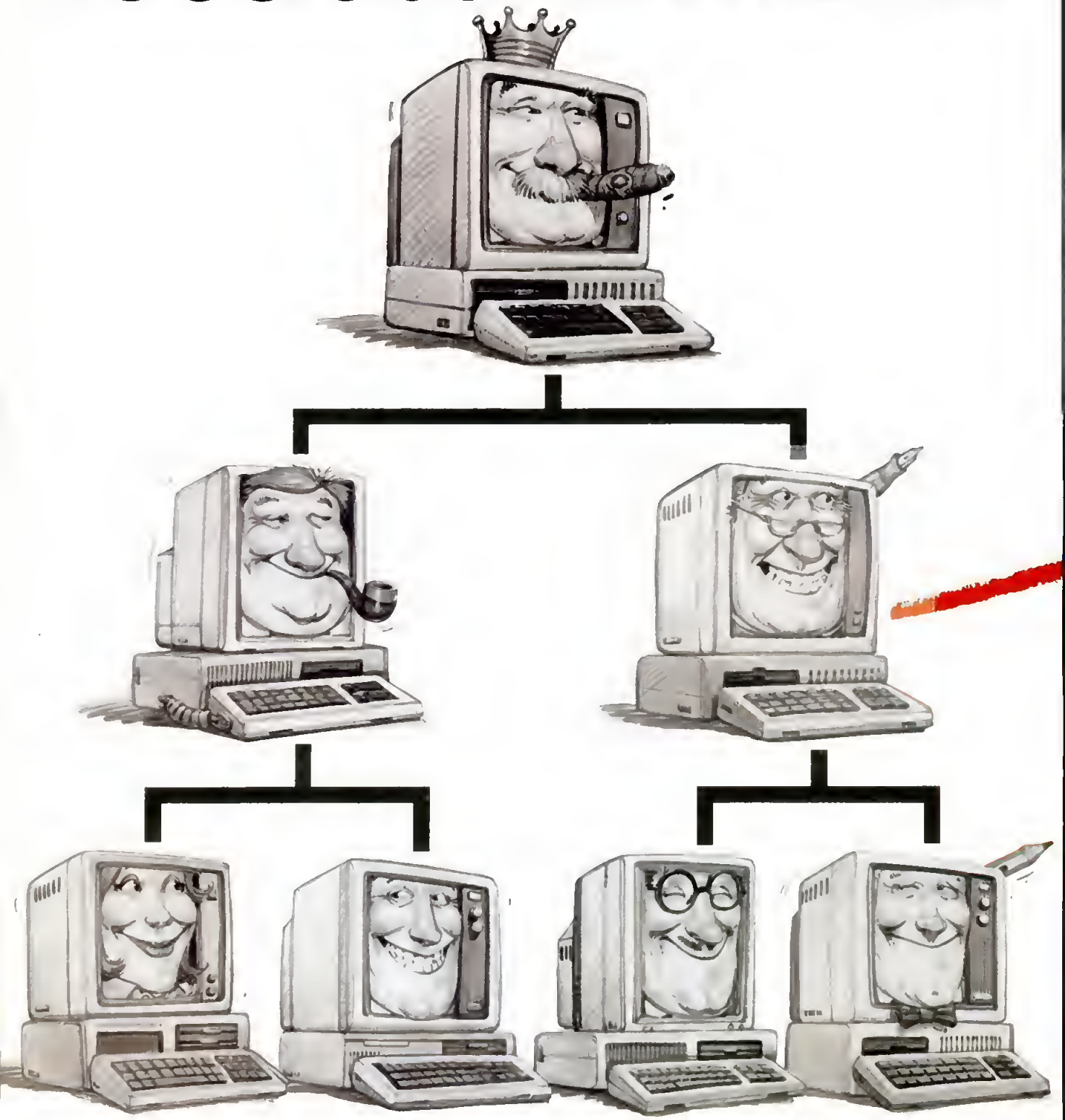
IBM is a registered trademark of International Business Machine Corporation. DEC and VAX are trademarks of Digital Equipment Corporation. Ethernet is a registered trademark of Xerox, Corp. Polygon, poly and the Polygon logo are registered trademarks of Polygon, Inc.

©1987 Polygon, Inc.

polygon®

CIRCLE 139 ON READER SERVICE CARD

# Crosstalk Network Because Networks



# Communications. Are Only Human.

Now CROSSTALK's® benefits are available to every user on your IBM PC Network, IBM Token Ring Network, or other NETBIOS-compatible network.

That means significant hardware savings, by sharing a single modem and phone line among any number of network workstations.

But your network users share something just as important—the flexibility and ease-of-use that make CROSSTALK the most popular communications software for the PC.

Any network user can exchange files with a wide variety of other PCs, PC Networks, minicomputers and mainframes, including information utilities.

They can exchange files peer-to-peer within the network, at very high speed, without the need to go through the server.

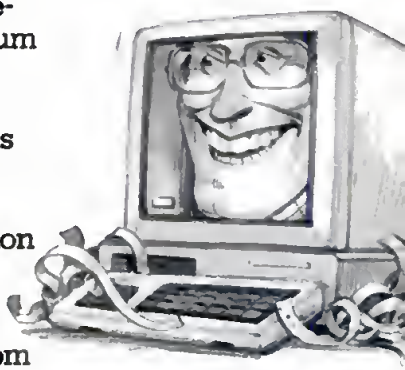
And no one has to be a computer guru to do it. CROSSTALK adjusts to each operator's skill level. It's simple for beginners, who can do useful work immediately. Yet it's fast and powerful in the hands of an expert. It gives you the option of menu operation or direct commands.

It allows you to create "script files" containing commands and entries needed to complete an individual communications session. Any user on the network can create automated "scripts" for routine sessions, and other users can repeat the sessions with a minimum of keyboard commands.

In effect, every user on the network shares communications skills as well as equipment and software.

CROSSTALK Network Version gives you the communications potential that you expect from the standalone PC version. It emulates a wide range of popular terminals. It offers most protocols, including your own CROSSTALK protocol, XMODEM, and KERMIT.

For details on making use of the network savings potential of the CROSSTALK Network Version, see your dealer or ask us for a spec sheet.

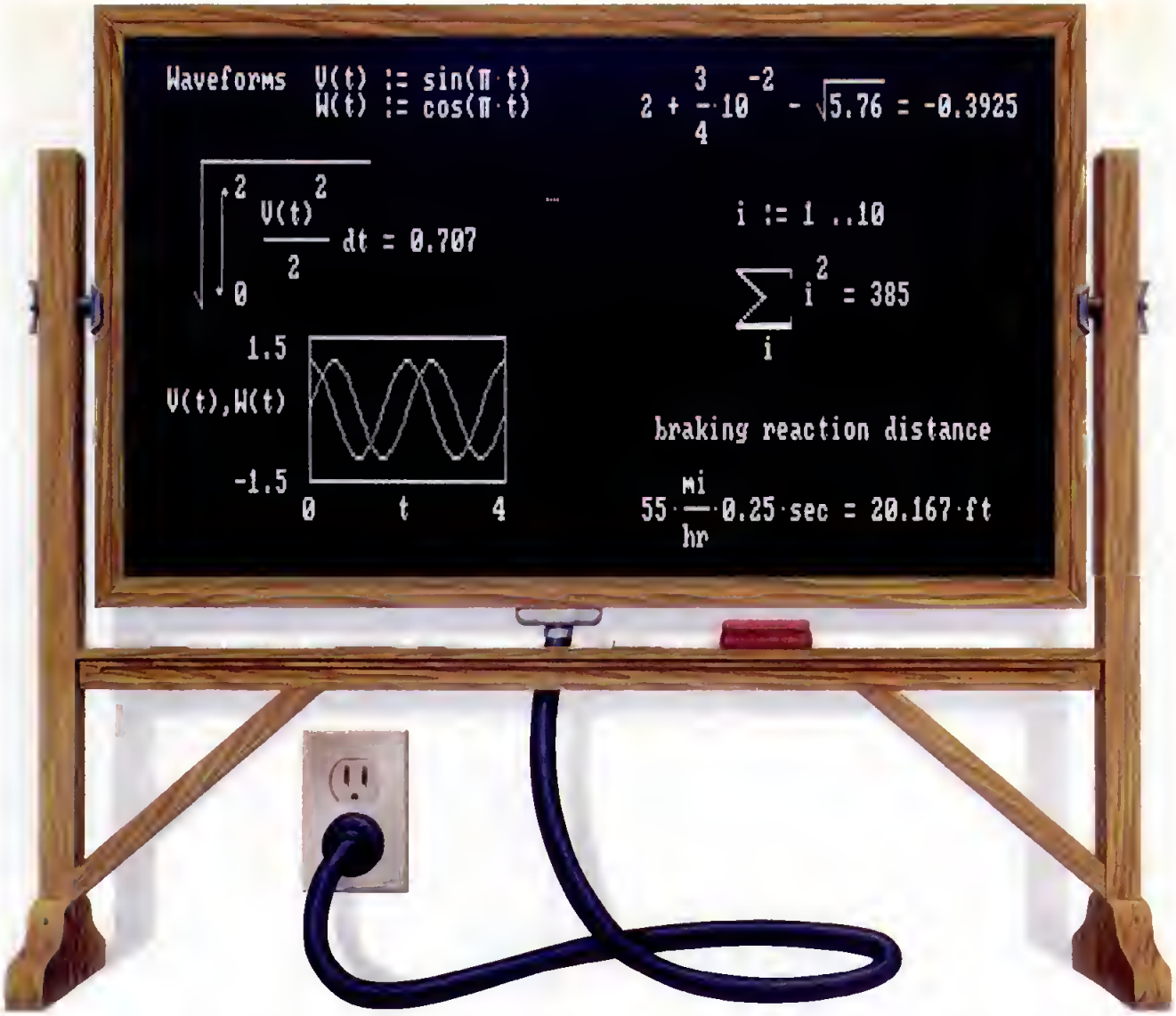


CROSSTALK® XVI
NETWORK VERSION

Digital Communications Associates, Inc.
1000 Holcomb Woods Parkway
Roswell, Georgia 30076
1-(800)-241-6393

CROSSTALK is a registered trademark of Digital Communications Associates, Inc.

CIRCLE 340 ON READER SERVICE CARD




# Engineering calculation raised to a new power.

**The only software program to combine the flexibility of a blackboard, the simplicity of a calculator, and the power of a personal computer.**

Now you can write calculations on your PC in standard math notation—mixing text, formulas and graphics with the same free-form ease you have on a blackboard or scratchpad.

**No new languages to learn.**
Simply type equations anywhere on the screen and MathCAD automatically calculates and displays your results as numbers or graphs—exactly as you want to see them. Change anything, and MathCAD instantly recalculates the results. Add text at any point to support your work. Then print and save your entire calculation as an integrated document.

**Powerful built-in functions.**
MathCAD handles both real and complex numbers and does automatic unit conversion and dimensional analysis. It has a full range of built-in functions including integration, differentiation, fft's and cubic splines. Or you can define your own. No wonder thousands of engineers use MathCAD every day, for everything from robotics to signal processing and thermodynamics to fluid mechanics.

**Call us today.**
We're convinced that MathCAD belongs on every engineer's desk. At $249, with our no-risk, 30-day money-back guarantee, you really can't afford not to try it. To place your order or to request further information, call us now at:

## 1-800-MathCAD

(in Massachusetts: 617-577-1017)

MathCAD. Once you've tried it, you'll wonder what you ever did without it. Order today.

Requires IBM PC® or compatible, 512KB RAM, graphics card. IBM PC is a registered trademark of International Business Machines Corporation. MathCAD™ MathSoft, Inc.

**MathCAD**

MathSoft, Inc., 1 Kendall Sq., Cambridge, MA 02139

CIRCLE 154 ON READER SERVICE CARD

# AutoSwitch EGA 480 Adapts to Any Monitor, Most Video Modes

PC HANDS ON

BY WINN L. ROSCH

Now that the emulation of EGA and shrinking display adapters to half-card size is commonplace, video adapter makers have taken a new tack in attracting interest—multiple compatibility.

One of the latest of these accommodating video adapters is Paradise Systems' AutoSwitch EGA 480 Card.

The list of the AutoSwitch emulations is quite a lengthy one: IBM monochrome, Hercules graphics, CGA, EGA, and Plantronics, all in addition to some modes of its own.

As its name implies, however, the AutoSwitch goes beyond other multimode monitor adapters by automatically adjusting itself to the type of monitor that it's attached to, selecting its own synchronizing frequencies to match monochrome, CGA, and EGA display types.

The 480 part of its name hints at another AutoSwitch ability. With monitors that can accommodate a 30.5 horizontal frequency, the AutoSwitch adds an extra display mode with 640- by 480-pixel resolution in 16 colors.

A disk of software drivers is supplied to run *1-2-3*, *Microsoft Windows*, *CADVance*, *EGA Paint*, and *AutoCAD* in 640 by 480 mode.

Perhaps the most amazing part of the AutoSwitch is that it uses so little circuitry—just 256K bytes of RAM, a ROM chip, Paradise Systems' own VLSI video chip, and some discrete and TTL support circuitry on a single 5-inch-long, 8-bit bus card.

Despite the engineering expertise represented by the AutoSwitch features, not all of its emulations are perfect. For instance, attribute mapping in monochrome apparently does not match IBM's.

Nevertheless, its automatic monitor-determining abilities make the AutoSwitch a top choice if you shuttle PCs between different displays. PC

PC MAGAZINE FACT FILE

**AutoSwitch EGA 480 Card**
Paradise Systems
217 E. Grand Ave.
South San Francisco, CA 94080
(415) 588-6000
**List Price:** $599
**Requires:** Enhanced color or multisync monitor.
**In Short:** A multimode EGA card that can automatically select its mode to match the display it's plugged into and offers resolution up to 640 by 480 pixels in 16 colors.

CIRCLE 423 ON READER SERVICE CARD

# Bas2Pas: Converts BASIC into Pascal

PC HANDS ON

BY STEPHEN RANDY DAVIS

*Bas2Pas* is a conversion routine that promises to "turn your spaghetti BASIC into structured Pascal." It's an ambitious claim, but, with some limitations, the program can deliver.

Its eight passes perform several optimizations, including breaking large BASIC programs up into smaller modules and replacing certain BASIC goto patterns with their more structured Pascal equivalent. *Bas2Pas* can generate Turbo Pascal, Professional Pascal, or ANSI standard Pascal from BASICA or ANSI BASIC.

To test its performance, I converted a Sieve written in BASIC into Turbo Pascal. The resulting program had two problems, however. The statement "WHILE ((k<=lim) <> 0)" generated a "TYPE MISMATCH" compilation error; when I removed the "<> 0" the program could be compiled.

The second error was more subtle. The variable COUNT was never initialized to 0. BASIC does this automatically. Turbo does not. Adding a "COUNT := 0;" resulted in a working Sieve.

Customers can evaluate the program by mailing sample BASIC programs with a self-addressed, stamped envelope to Gotoless Conversions; the company will return Pascal code. PC

```
100 DEFINT A-Z
110 LIM = 8190
120 DIM FLAGS(8191)
130 PRINT TIME$
140 FOR I=0 TO LIM
150   FLAGS(I) = -1
160 NEXT I
170 PRINT TIME$
180 FOR I=0 TO LIM
190   IF FLAGS(I) = 0 THEN 270
200   PRIME = I+I+3
210   K = I+PRIME
220   WHILE K <= LIM
230     FLAGS(K) = 0
240     K = K + PRIME
250   WEND
260   COUNT = COUNT + 1
270 NEXT I
280 PRINT COUNT; "PRIMES"
290 PRINT TIME$
```

**Figure 1:** *A Sieve routine in BASIC.*

```
{ FOR }
Writeln(time_str);
FOR i := 0  TO  lim DO
  BEGIN

    IF ( Not (  flags[  i ] = 0 ))
      THEN
        BEGIN
          prime :=    i + i + 3 ;
          k :=    i + prime ;
          WHILE ( (   k <=  lim ) <> 0 ) DO
            BEGIN
              flags[  k ] :=  0;
              k :=    k + prime ;
            END;
            ;
          { WHILE }
          count :=    count + 1 ;
        END;
    { IF }

  END;
  ;
{ FOR }
Writeln(count,  'PRIMES');
Writeln(time_str);
halt  { BASIC END };
END;      { sub110  }

BEGIN.          { main program : sieve }
  sub110;
END.            { main program : Sieve }
```

```
PROGRAM sieve(Input, Output);
CONST
  max_string_length = 255 ;
TYPE
  Single = Real ;
  Double = Real ;
  Basicstring = String[ max_string_length ];


{$I graph.p}
{$I general}

PROCEDURE sub110; FORWARD;

PROCEDURE sub110;
VAR
  count           : Integer ;
  flags           : Array[ 0 .. 8191 ] OF Integer ;
  i               : Integer ;
  k               : Integer ;
  lim             : Integer ;
  prime           : Integer ;

BEGIN     { sub110  }
  lim :=  8190;
  Writeln(time_str);
  FOR i := 0  TO  lim DO
    BEGIN
      flags[  i ] :=    - 1 ;
    END;
    ;
```

**Figure 2:** *The resulting Pascal code after* Bas2Pas *has converted the program.*

PC MAGAZINE FACT FILE

***Bas2Pas***
Gotoless Conversions
P.O. Box 50068
Denton, TX 76206
(214) 221-0383
**List Price:** $200; a 1,000-line economy model is available.
**Requires:** 256K RAM, DOS 2.0 or later.
**In Short:** A menu-driven conversion program to transform BASIC code into Pascal. Not copy protected.

CIRCLE 425 ON READER SERVICE CARD

■ NEW ON THE MARKET ■ JONATHAN MATZKIN

## Axonix Enhancements Add Hard Disk, Slots to The T1100 Plus Laptop

Laptop PCs are fast evolving into power tools that rival many high-performance desktop models. Accessory manufacturers are getting into the act by offering upgrades for the more-popular laptops. **Axonix Corp.** has announced two hard disk expansion kits for the Toshiba T1100 Plus laptop.

The ThinWin is an internal hard disk that replaces the Toshiba's B: drive and adds only 8 ounces to the weight of the system, according to Axonix. The drive is available in 10- ($995) or 20- ($1,295) megabyte capacities and is retrofitted by Axonix or an authorized dealer.

The ThinPack 1100 is a user-installable external expansion chassis that contains a 10- ($1,195) or 20- ($1,395) megabyte hard disk, a rechargeable battery, and two expansion slots that accommodate PC-compatible half-cards. The ThinPack 1100 weighs 4.5 pounds and adds 1.5 inches to the thickness of the T1100 Plus.

**List Price:** ThinWin, with 10-Mbyte hard disk, $995; with 20 Mbytes, $1,295. ThinPack 1100, with 10-Mbyte hard disk, $1,195; with 20-Mbyte hard disk, $1,395. **Requires:** Toshiba T1100 Plus. Axonix Corp., 2257 S. 1100 East, #2C, Salt Lake City, UT 84106; (801) 466-9797.

CIRCLE **433** ON READER SERVICE CARD

## OASys Debuts a Line of Low-Cost, 8-Page-Per-Minute Laser Printers

As laser printers become more commonplace in the PC industry, prices continue to plunge. **Office Automation Systems** has added to its line of low- to moderately priced lasers with the announcement of the LaserPro Silver Express ($2,995) and the LaserPro Gold Express ($3,695).

The new units join the $1,895 LaserPro Express, which has been available since late 1986 and is one of the lowest-priced lasers on the market. All three of the 8-page-per-minute printers feature 300-dot-per-inch resolution and downloadable font capability. They also provide emulation of the Hewlett-Packard Laserjet, NEC 3550, Diablo 630, and Epson FX-80. The three LaserPro printers use Office Automation's proprietary print engine, which the company says has a print life of 300,000 pages and a duty cycle in excess of 3,000 pages per month.

The LaserPro Express comes with 512K RAM, while the LaserPro Silver Express has 768K bytes of RAM. The Silver Express also adds four more emulations and 25 standard bit-mapped fonts. It has Office Automation's *Express* command language and *Pyramid* font system.

*The $2,995 LaserPro Silver Express is an 8-page-per-minute laser printer from Office Automation Systems. It has 768K bytes of RAM.*

The top-of-the-line LaserPro Gold Express offers Hewlett-Packard's graphics language and also features 1.5 megabytes of RAM, in addition to all of the features that are found on the lower-priced LaserPro Silver Express printer.

**List Price:** LaserPro Express, $1,895. LaserPro Silver Express, $2,995. LaserPro Gold Express, $3,695. Office Automation Systems Inc., 8352 Clairemont Mesa Blvd., San Diego, CA 92111; (619) 576-9500.

CIRCLE **432** ON READER SERVICE CARD

HOT PROSPECT

## Microsoft CD-ROM Reference Library Assembles Ten Works on Optical Disk

**Microsoft Corp.** brings CD-ROM mass storage a step closer to the average PC user by announcing the first general-interest software distributed on optical disks. *Bookshelf*, a $295 library of reference tools, exploits the enormous capacity of the new technology.

*Bookshelf* is distributed on a single CD and includes a dictionary, thesaurus, *1987 World Almanac and Book of Facts*, *The Chicago Manual of Style*, and *Bartlett's Familiar Quotations* among a total of ten common reference volumes. The package runs as a memory-resident program in conjunction with any of 14 popular word processors, including *Microsoft Word*.

*Microsoft's $295* Bookshelf *is the first CD-ROM distributed application that will interest a broad range of general PC users. The package collects ten commonly used reference works on a single optical disk.*

Users can access *Bookshelf* from inside a word processor and obtain information in seconds, Microsoft says. The program performs context-sensitive searches, and users are also free to browse through *Bookshelf*'s component reference works, in the same way that printed works can be explored.

Reference information can be pasted into a document, and a copyright citation is automatically included after each paste operation. A Bookmark feature marks an unlimited number of user-defined passages for later recall from a Bookmark list.

A consistent command structure for each reference source increases efficiency, and *Bookshelf* incorporates on-line, context-sensitive help. Microsoft includes an on-line training package with *Bookshelf*.

**List Price:** *Bookshelf*, $295. **Requires:** 640K RAM (512K for hard disk systems), two disk drives, additional CD-ROM disk drive with MS-DOS CD-ROM extensions, DOS 3.1 or 3.2. Microsoft Corp., 16011 NE 36th Way, Box 97017, Redmond, WA 98073-9717; (206) 882-8080.

CIRCLE **428** ON READER SERVICE CARD

## Graphics Board Uses A Texas Instruments' Processor, Intel Chip

**Number Nine Computer Corp.** has announced the Pepper SGT, a high-performance graphics card that employs both the Texas Instruments 34010 processor and Intel's 82786 graphics chip on a single board. The $995 card comes with 1 megabyte of on-board memory, expandable to 4 megabytes, and offers four software-selectable resolutions.

The board's low-resolution mode displays up to 256 colors simultaneously from a palette of 16.7 million, at resolution of 640 pixels by 480 lines. A higher-resolution mode displays up to 16 colors from the same pal-

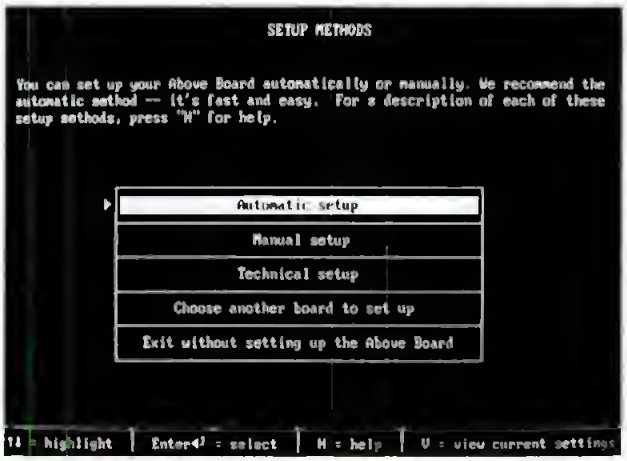
## Intel's Add-in Memory Card Fits Inside The PC-XT Model 286, Installs Easily

**Intel Corp.**'s latest add-in AT memory boards are small enough to fit in the IBM PC-XT Model 286 and have easy-to-use installation software, the company says. The Above Board 286 and the Above Board PS/286 feature switchless and jumperless installation.

The installation program can be run at any time to reconfigure the Above Board memory. Expanded memory can be partially or completely reconfigured as extended memory to use with protected-mode DOS applications when they become available.

The Above Board 286 provides up to 2 megabytes of memory, which can be used as conventional memory (between 512K and 640K), expanded and extended (protected-mode) memory in the IBM PC-XT Model 286, AT, and compatible systems. The Above Board 286 can run at up to 12.5 MHz.

The Intel Above Board PS/286 is identical to the Above Board 286, except that it adds a standard serial port and the option of having a second user-installable serial port.




*Intel's Above Board 286 ($695 with 512K) and Above Board PS/286 ($795 with 512K) come with simple-to-use installation software that can be used at any time to reconfigure the cards' memory.*

An optional piggyback memory card provides 2 megabytes of additional memory.

The key to Above Board's simple installation is a custom, electrically erasable, programmable ROM chip. The EEPROM saves space on the board, Intel says, and stores information that aids technical support.

Intel notes that the boards can also be used for conventional and expanded memory in IBM PCs, XTs, and compatibles.

**List Price:** Above Board 286 with 512K, $695; with 2 Mbytes, $1,145. Above Board PS/286 with 512K, $745; with 2 Mbytes, $1,195. Additional serial port, $50. Piggyback board with 512K, $495; with 2 Mbytes, $995. Intel Corp., Mail Stop TOD-07, 5200 NE Elam Young Pkwy., Hillsboro, OR 97124-6497; (503) 629-6497.

CIRCLE **429** ON READER SERVICE CARD

ette at a resolution of 1,280 by 480. A third mode displays 16 colors at 800 by 600 resolution. These modes all support multiscanning monitors.

A 1,280 by 350 resolution monochrome mode supports the IBM monochrome display but does not support multiscanning monitors. The Pepper SGT is also IBM CGA and MDA compatible. When running under IBM emulation, the card generates text from Number Nine's own firmware-contained 16- by 19-character cell array. The resulting text is considerably sharper than EGA text and requires no special drivers. Number Nine has already written graphics drivers that support *Microsoft Windows* and *1-2-3* among other popular packages.

EGA compatibility is available as a hardware option. Number Nine expects to begin shipping the Pepper SGT by early summer.

**List Price:** Pepper SGT with 1 Mbyte of on-board video RAM, $995. Number Nine Computer Corp., 725 Concord Ave., Cambridge, MA 02138; (617) 492-0999.

CIRCLE **431** ON READER SERVICE CARD

## 2.5-Pound Removable Hard Disk System Stores 30 Megs and Is Shock Resistant

**Tandon Corp.** has announced a lightweight, removable hard disk. The Personal Data Pac (approximately $350) is a 30-megabyte drive that Tandon says combines complete removability with all the advantages of Winchester technology in a compact, rugged package. The drive weighs 2.5 pounds and is about the size of an SLR camera. Storage capacity as large as 100 megabytes in the same size package is a future possibility, according to Tandon.

Tandon claims that the shock-mounted, fully enclosed Winchester disk will survive a fall from a desktop and can be shipped through the U.S. mail without special packaging.

Backup of 30 megabytes of data from one Personal Data Pac to another is accomplished in 3 minutes, Tandon says. The drives have an 85-millisecond access time, but a 128K-byte cache on the drive controller reduces effective access time to 35 milliseconds, according to Tandon.

The Pac 286, a small footprint AT-compatible computer (approximately $800), has two specially designed receptacles that each accommodate a Personal Data Pac, giving the system up to 60 megabytes of removable hard disk storage. The Pac 286 has an 80286 microprocessor, which runs at switchable clock speeds of 6 or 8 MHz. One megabyte of RAM is standard, and so are the integrated serial and parallel ports.

Current PCs can incorporate the data pac concept through the Ad-Pac2 (about $500), an external subsystem that connects to IBM PCs and true compatibles. The subsystem accommodates two personal data pacs and gives any PC the same 60-megabyte removable storage capacity of the PAC 286.

Tandon expects to begin volume shipments of the Personal Data Pac by early summer.

**List Price:** Personal Data Pac with 30 megabytes of storage, approximately $350. PAC 286 without drives, approximately $800. Ad-Pac2 without drives, approximately $500. Tandon Corp., 805 Science Dr., Moorpark, CA 93021; (805) 378-6081.

CIRCLE **430** ON READER SERVICE CARD

*Tandon's Personal Data Pac, approximately $350, is a self-contained, 30-megabyte removable hard disk. The shock-mounted Winchester drive can be safely mailed without any special packaging, according to Tandon. The hard disk drive weighs 2.5 pounds.*

# $169 dBXL Matches dBASE on Functions and Adds Windowing

PC HANDS ON

BY GLENN HART

Ashton-Tate's dominant *dBASE III* is used by beginners and professional software developers alike for everything from Christmas card lists to complete accounting suites. Programs that hope to knock *dBASE* from its perch appear with some regularity.

*dBXL* is a new interpreter from WordTech Systems, maker of the *dBASE* compiler *Quicksilver*. It enters the fray with a list price of only $169, undercutting *dBASE III Plus* by $526.

Database managers who like to compile their applications for the speed and ease that they gain will find *dBXL* especially appealing. There are many advantages to an interpretive environment. You can query the database, edit data, and perform other data manipulations by entering questions directly from the keyboard. Programming in the interactive mode is more convenient.

## More Than a Twin

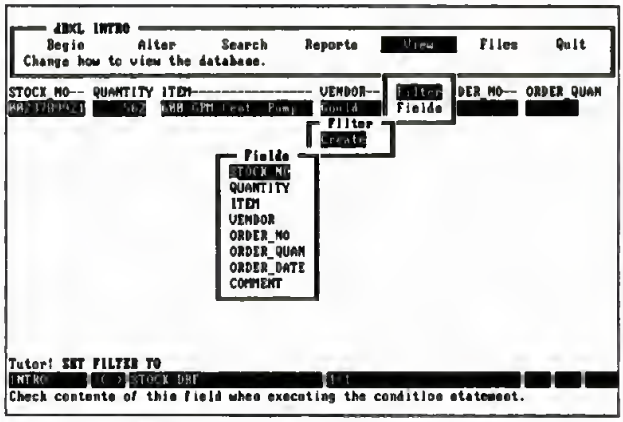
*dBXL* was designed to be a functional twin of *dBASE III Plus*, but there are clear differences between the two pieces of software.

There is no Assist in *dBXL*, but a similar, somewhat less complete, hand-holding program, which is called Intro, is supplied instead. None of the catalog, view, and screen commands and files or import and export facilities (except to .SDF and delimited formats) are supported. *dBXL* is resolutely single user; none of the *dBASE III Plus* networking commands are implemented. There are a few other niggling syntax and operational differences that won't matter to many programmers.

Other than that, *dBXL* is highly compatible.

Lest you think *dBXL* is only a lower-priced clone, it also adds a long and impressive list of enhancements to the basic *dBASE* language. An excellent windowing system allows you to create colorful windows, move and resize them, and even save or retrieve them from disk. You have the ability to structure a complex windowing system that can display data from multiple files, pop up context-sensitive help windows, and more. When there is a mistake in a program, *dBXL*'s Fix option invokes the program editor with the cursor positioned to the error and then resumes program execution after you have modified the program code. A clever Automem variable system makes it easier to validate and manipulate memory variables that are intended for entry into a database by transferring the contents of memory variables directly to fields with the same names.

Sixteen useful new functions are provided, too, including such conveniences as converting strings to proper noun capitalization, creating Soundex codes, and more. Useful little enhancements include a prompt that displays the currently selected work area number and name and pull-down help windows.




*dBXL's Intro facility parallels dBASE's Assist module; it's one of the few areas in which dBXL falls short of the database master.*

## A RAM Hog

*dBXL* is a bit of a memory hog, requiring at least a 512K-byte system to run. *dBASE III Plus* requires only 256K to get up and running.

Execution speed on a 10-MHz AT in RAMdisk was not very impressive, but speed alone is not the primary issue with a product like *dBXL*. *dBXL* is priced so much lower than the rest of the competition that it will appeal to the occasional database user who wants the power of a *dBASE III Plus* but cannot justify the expenditure since most of his applications are compiled.

Our test reports ran without any need for adjustment—a testament to the program's compatibility with *dBASE*.

Of course, the problem with compiled applications is the inability to directly access the datafiles interactively. No programmer can think of every situation.

Similarly, in spite of the best safeguards, data sometimes gets corrupted or mismanaged. Having an interpreter on hand makes it much easier to handle both these circumstances, but buying a copy of *dBASE* at $695 is often deemed unreasonable. *dBXL* is so inexpensive that I forecast many users of *Quicksilver* and *Clipper* applications will buy a copy just for situations like this.

The documentation is a substantial bound volume of slightly over 600 pages. It is clearly written and comprehensive—definitely a step up from Ashton-Tate's cumbersome manuals for *dBASE III Plus*.

*dBXL* is highly compatible overall. In some aspects it's a subset of *dBASE III Plus* and in others it's a superset, with its many extensions. It's not lightning fast, but it is definitely an incredible bargain. There's no less-costly method of joining the *dBASE* fraternity.

## dBASE-Compatible Report Speed

| | Report 1 | Report 2 |
|---|---|---|
| FoxBASE Plus | 0:26 | 1:10 |
| Quicksilver | 0:46 | 1:46 |
| dBASE III Plus | 1:25 | 3:34 |
| dBXL | 2:49 | 6:23 |

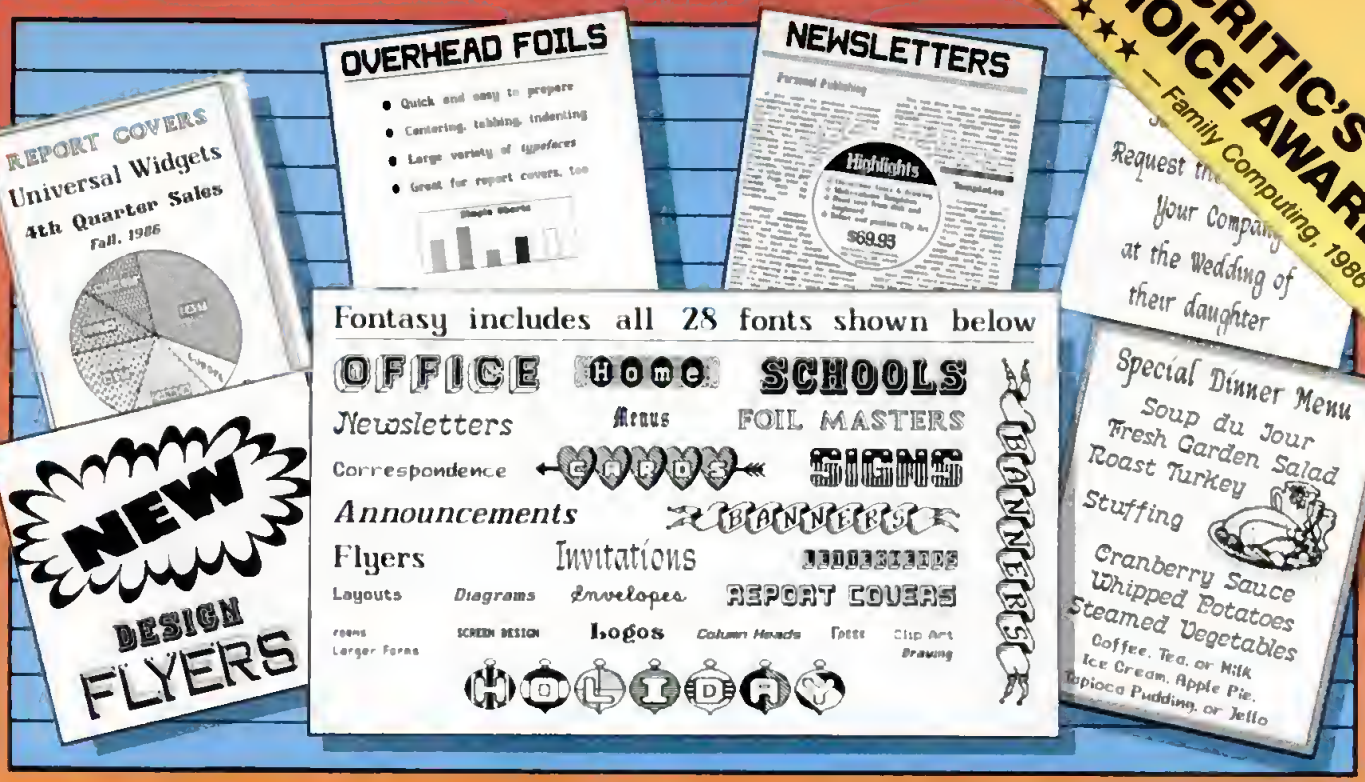
*(Times given in minutes: seconds)*

FoxBASE Plus *and* Quicksilver *have a clear advantage in generating our two sample reports: the application was already compiled* dBASE III Plus *and* dBXL *generated the reports in an interpreted environment.*

PC MAGAZINE FACT FILE

*dBXL*
WordTech Systems Inc.
P.O. Box 1747
Orinda, CA 94563
(415) 254-0900
**List Price:** $169
**Requires:** 512K RAM, two disk drives.
**In Short:** A database manager that's highly compatible with *dBASE III* for a fraction of the cost. Not copy protected.

CIRCLE 422 ON READER SERVICE CARD




Fontasy printed all of these.

# See What You Can Do With FONTASY®

**Presentations! Newsletters! Flyers! Signs! Overhead foils! Invitations! Menus! Logos! Announcements! Banners! Layouts!** When you need a good-looking visual quickly, you need FONTASY — superb typefaces, drawing, and pictures in one easy-to-use package.

FONTASY gives you a **"what-you-see-is-what-you-get"** picture, as you type and draw on the graphics screen of your IBM-PC. You can create a page at a time, see a mini-picture of it, print it, and save it on disk. Page size is limited only by memory, not by screen size.

## Highlights

Proportional space, justify, kern, boldface, re-position, magnify and shrink, black/white reversal, rotate, mirror image, lines, rectangles, ovals, draw, fill-in, undo (and un-undo), on-line help, 200-page book, and easy control from keyboard or mouse.

**Fonts and clip art!** We have hundreds of low cost Add-On typefaces and pictures in our growing library, and will be happy to send you free print samples on request.

**"Anyone who needs quick, in-house production of flyers, banners, hand-outs, and newsletter-type documents will enjoy Fontasy."—Robin Raskin, PC Magazine, May 13, 1986**
**". . . excellent desktop publishing program."— Jerry Pournelle, BYTE, September, 1986.**

## Equipment Needed

IBM PC XT, AT or true compatible (Compaq etc.) with IBM or Hercules graphics adapter and graphics monitor. 256K memory needed for partial pages, 512-640K recommended for full pages on most printers. Mouse optional. MS DOS 2.10 or above. FONTASY supports IBM Graphics Printer, Proprinter, Epson FX, JX, LX, MX, RX and LQ, C Itoh 8510, 1550, 1570, Prowriter-Jr, H-P LaserJet, LaserJet-Plus, ThinkJet, Microline 92-293 (native or IBM compatible), Gemini 10X, 15X, Radio Shack DMP 105, 430, 2100, Ricoh Laser, Toshiba 351, 1340, 1351, Star and most IBM Epson-compatible printers.

**$69.95**

**Includes 28 Fonts & 60 small pictures**

## Money-Back Guarantee

FONTASY is not copy-protected and has a 30-day money-back guarantee. To order the best bargain in desktop publishing software, call now:

**818-765-4444**

**PROSOFT®**
7248 Bellaire Ave., Box 560
No. Hollywood, CA 91603-0560

**FONTASY $69.95**
Tax _____
Shipping _____
Total _____

Name _____ Company _____
Address _____ Telephone _____
City, State, ZIP _____
Visa/MC _____ Exp. Date _____
Computer _____ Memory _____ Printer _____
Terms: M/C, Visa, checks. Please add $3.00 shipping and handling in U.S. or Canada, $15.00 overseas, $2.00 for C.O.D., and sales tax in Calif.

CIRCLE 300 ON READER SERVICE CARD

# GRiD Packs 80C86 Power into a Sleek, New 9.3-Pound Laptop

PC HANDS ON

BY NORA GEORGAS

Since 1982, GRiD has been making compact, high-performance portables known for high-end features and big-ticket prices.

In the design sense at least, the 9.3-pound 80C86-based GRiDlite could be called the Maserati of laptops. Its superb styling is a real knockout—all sleek black lines and sloping curves.

Its $1,750 base price puts it right into the range of popular laptops made by Toshiba, NEC, and Zenith. For that price, you get 128K bytes of RAM (expandable to 640K), a single 3½-inch drive, built-in DOS, *InteGRiD* (GRiD's desktop management software), and a carrying case. You can add up to a megabyte of EMS memory and a megabyte of RAM, and four ROM sockets are available for applications software. A $495 Hayes-compatible 1,200-bit-per-second modem completes the picture.

If you want to swagger into your local computer dealer, slap down your platinum American Express card, and drawl "Gimme a lite...a GRiDlite," you're out of luck. The company sells only through its 22 direct sales offices in Europe and North America. Emphasis is on corporate contracts, and the company will "burn-in" the software of your choice onto ROM chips.

If you're tired of laptop computers that look like sewing machines or require upper legs as long as Patrick Ewing's, it might be worth a trip to one of those sales offices.

*You might call the external drive essential: the GRiDlite has one drive bay.*

At 11 by 13 by 3 inches (at its thickest point), the matte-black plastic case of the Japanese-made GRiDlite makes it the sleekest, most-streamlined laptop computer around. Circuitry, battery pack, and ROM chip sockets are concealed by a slide-off panel at the rear of the machine. Even the GRiDlite's back panel, with its RGB, serial and parallel outputs, and external floppy disk drive interface, is discreetly hidden behind a clever flop-down panel that can be used as a little stand to elevate the keyboard almost an inch off a desktop and provide a better typing angle. The LCD is so legible that even our resident Zenith disciple acknowledged it was good. Its aspect ratio is 2:1.

The GRiDlite will be the darling of the Ambassador Club, but don't plan on computing your way through a transatlantic flight. Battery life of the GRiD's 9.6-volt rechargeable nickel cadmium battery is rated at 3 to 4 hours, but we were hard-pressed to squeeze 2 hours out of it, and that was with minimal disk access.

Competitive machines such as the Zenith Z-181 and the Toshiba T1100 really do offer 4 and 5 hours of use, while the PC Convertible gives you up to 8.

The keyboard has a firm, full-travel feel, and the slightly roughened surface of the keycaps gives a nice nonskid grip, which is useful for breakneck speed typing.

The GRiDlite is a competent, low-cost unit that's perfect for customizing. If you don't mind the cramped keyboard and you're tired of looking like a nerd with your beige knee-bruisers, take a look at this post-modernist marvel. PC

## PC MAGAZINE FACT FILE

**GRiDlite**
GRiD Systems Corp.
2535 Garcia Ave.
P.O. Box 7535
Mountain View, CA 94039
(415) 961-4800
**List Price:** $1,795 with 128K RAM; optional external drive, $295; modem, $495.
**In Short:** A lightweight (9.3-pound) single-floppy laptop with four ROM sockets and EMS expandability, the GRiDlite will appeal to business users with customized applications. It's the best-looking laptop on the market today.

CIRCLE 427 ON READER SERVICE CARD

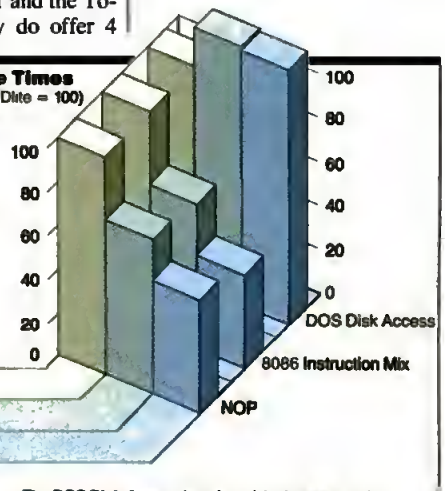
PC LABS

## Benchmark Tests: GRiDlite vs. Toshiba T1100 Plus and NEC MultiSpeed

The GRiDlite's 80C86 runs fast but not as fast as the NEC MultiSpeed, which has a clock speed of 9.54 MHz. But the GRiDlite wins out in disk access speed, in which the benefits of its 16-bit bus are felt.

**Performance Times**
(Times given in seconds except where noted)

| Product | NOP | 8086 Instruction Mix | DOS Disk Access (milliseconds) |
|---|---|---|---|
| GRiDlite | 7.0 | 28.3 | 256.4 |
| Toshiba T1100 Plus | 5.0 | 19.0 | 303.0 |
| NEC MultiSpeed | 3.7 | 12.4 | 298.6 |




The **NOP** benchmark test is designed to measure raw clock speed and memory access time while minimizing differences in microprocessors and the effect of memory caching. This test executes almost nothing but NOP ("No Operation") machine code instructions in a big 128K loop.

The **8086 Instruction Mix** benchmark test measures the time it takes to execute a selected series of processor-intensive tasks. The test program uses 8086 instruction code. These instructions are a subset of the total processor instruction set.

The **DOS Disk Access** benchmark test measures the time it takes to do a random sector using DOS. DOS buffers are set at 3 and the interleave factor is left at the driver's default setting. This test adds DOS's overhead to the BIOS and hardware times. The test program performs the sector read 1,000 times within the DOS disk partition. The average result is shown in milliseconds.

# Well Connected.

At WordPerfect Corporation, it's not enough to have the leading word processor for IBM® PCs and compatibles. In this exploding era of connectivity, WordPerfect is reaching far beyond PCs to offer power word processing for an entire network of computers and systems.

## Network Connections.

WordPerfect Network gives local area network (LAN) users all the power of WordPerfect's stand-alone version with the added capability of network file sharing. Utilizing Novell's NetWare® Operating System Software, WordPerfect Network runs on nearly all major local area network systems. And it is fully compatible with a number of other LAN operating systems, including the IBM PC Network® and Token Ring Network®, 3Com Etherseries® and AST-PCnet®.

## Multiple Connections.

WordPerfect also offers versions for a host of other micro- and minicomputer systems, including Apple IIe®/IIc®/IIGS®, Data General®, VAX VMS® and DEC Rainbow.® Files from all of these versions can be interchanged to give you greater connectivity in a mixed-machine environment.

Plus, WordPerfect has announced versions for other machines as part of its strategy to support the major computer systems in the market. So no matter what hardware you choose, WordPerfect can be your standard of word processing software.

Get the well-connected word processor: WordPerfect. For more information, call or write WordPerfect Corporation, 288 West Center St., Orem, Utah 84057 (801) 225-5000.

WordPerfect CORPORATION

CIRCLE 513 ON READER SERVICE CARD

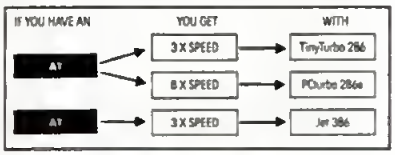
# VAROOMM

## ONLY ORCHID GIVES YOU SO MANY WAYS TO TURBOCHARGE PC ENGINES.

With Orchid's family of turbos, you can get the performance you bought a computer for in the first place. Lightning spreadsheet *recalc*ulations. CAD screens that *regen*erate in a flash. And large data bases that sort without putting you to sleep.

ORCHID'S TURBO FAMILY

| | TinyTurbo 286 | PCturbo 286e 12 | Jet 386 |
|---|---|---|---|
| Host Computer | PC, XT | PC, XT, AT | AT |
| Reference Speed | 3 x XT | 8 x XT | 3 x AT |
| Accelerator Type | Replaces 8088 | Co-processor | Replaces 80286 |
| CPU | 8 MHz 80286 | 12 MHz 80286 | 16 MHz 80386 |
| RAM | 8 K Cache | 1 or 2 MB EMS | 64 K Cache |




### GET THE EDITOR'S CHOICE: TinyTurbo 286.™

The TinyTurbo 286™ supercharges your XT to run *three times faster.* Yet it's so small it takes up only half a slot in your computer. Just two reasons why *PC Magazine* named it the Editor's Choice.

TinyTurbo 286 gives you a high level of compatibility. So you can run software like Lotus and Windows—with EGA graphics, EMS memory, or networking cards—at AT speed. You can even go back to your PC's regular 8088 chip, which remains in the system, giving you 100% hardware compatibility.

### ADD AWESOME PERFORMANCE: PCturbo 286e.™

For power users, the front runner today in accelerators is clearly the PCturbo 286e.™ It revs up to *8 times faster* than an XT, or up to *2.5 times* AT speed—giving you the world's fastest screen I/O. Plus the PCturbo 286e comes factory equipped with 1 Megabyte of fast RAM, expandable to 2.

The PCturbo 286e is also a powerful tool for developers and systems integrators. With features like an optional 10-MHz 80287 math chip, and coprocessing software for concurrent foreground/background tasks, the PCturbo 286e lets you build minicomputer-like performance into standard PCs.

### MOVE YOUR AT UP TO 386 HORSEPOWER NOW: Jet 386.™

Take a look today at the price/performance leader in desktop computing: the Jet 386.™ Depending on the application, it's up to *three times faster* than an AT. And *twice as fast* as some high-performance minicomputers. Yet you don't have to buy an expensive 386-based computer to get this kind of horsepower.

More importantly, the Jet 386 uses next generation technology, the 80386 microprocessor. So you can run all of the current software for the AT now, and 386 software too. Add a Jet 386 to your AT today, and you can extend the life of your investment—for a fraction of the cost.

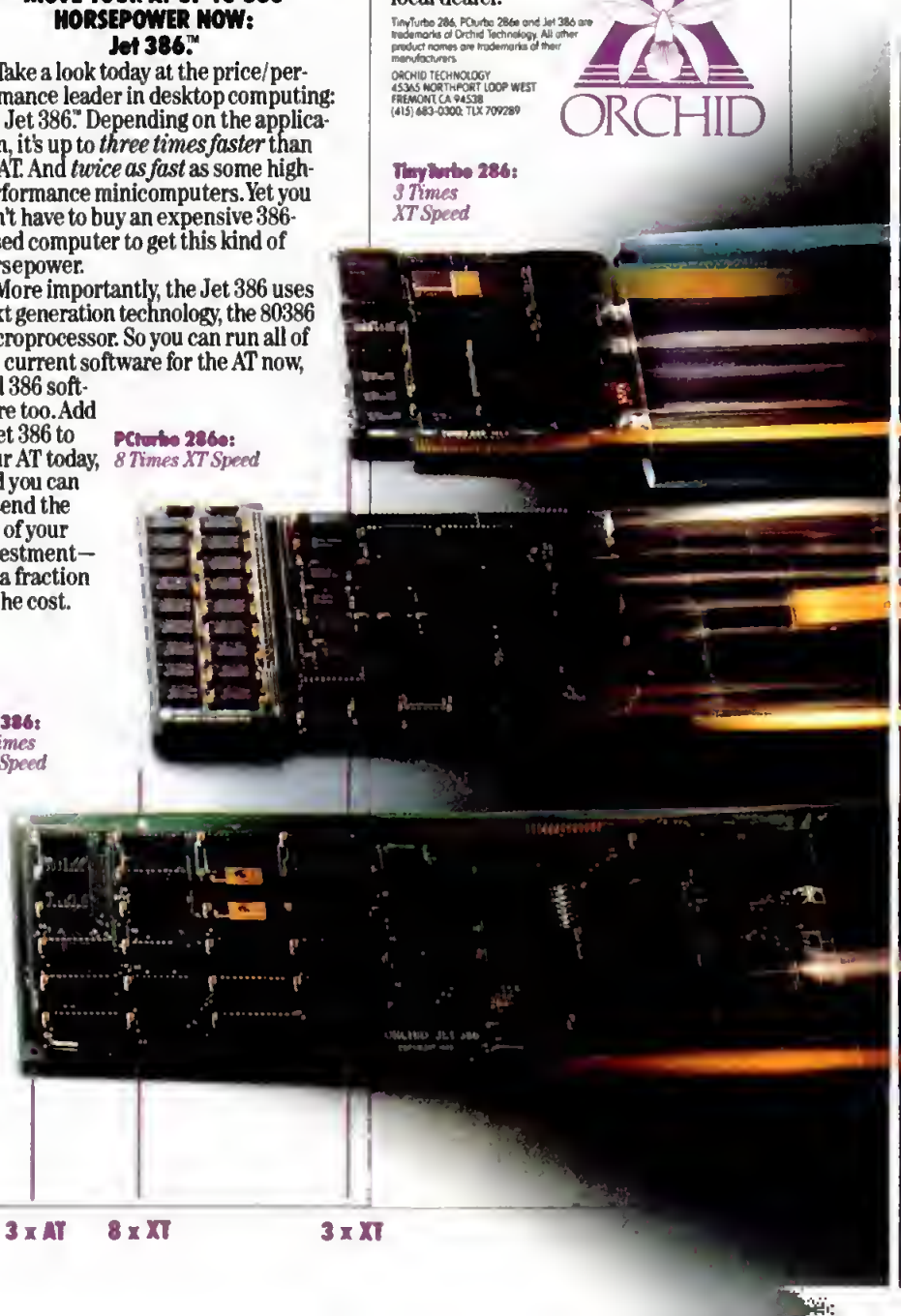
### FROM THE COMPANY THAT STARTED IT ALL.

Orchid introduced the first turbo for PCs, and has since become the number one supplier of PC accelerators. For details on our full line of accelerators, graphics, networks and multi-function cards, call **(415) 683-0300** today. Or contact your local dealer.

TinyTurbo 286, PCturbo 286e and Jet 386 are trademarks of Orchid Technology. All other product names are trademarks of their manufacturers.

ORCHID TECHNOLOGY
45365 NORTHPORT LOOP WEST
FREMONT, CA 94538
(415) 683-0300; TLX 709289

ORCHID




Circle R.S. 304 for TinyTurbo 286
Circle R.S. 305 for PCturbo 286e
Circle R.S. 306 for Jet 386

■ QUICK LOOKS

# Unit*Assistant Has the Right Measure

PC HANDS ON

BY ROBERT BARNETT

Whether you regularly work with quarts and kilograms or compute joules and horsepower, *Unit*Assistant*, from Thermal Systems Analysis, is a handy RAM-resident utility for converting measurements into different units.

*Unit*Assistant* sports a sweeping assortment of units that covers length, area, volume, density, mass, time, velocity, electrical flow, energy, and power.

The $75 utility accepts a number of abbreviations for unit names, and any attempt to carry out an improper conversion—such as square feet to cubic meters—is met with a message stating that the requested conversion is not dimensionally consistent.

Unlike *CanvertR* (see First Looks, page 59, Volume 5 Number 22), *Unit*Assistant* can handle any unit that has disparate elements, such as the unit kilograms per cubic inch.

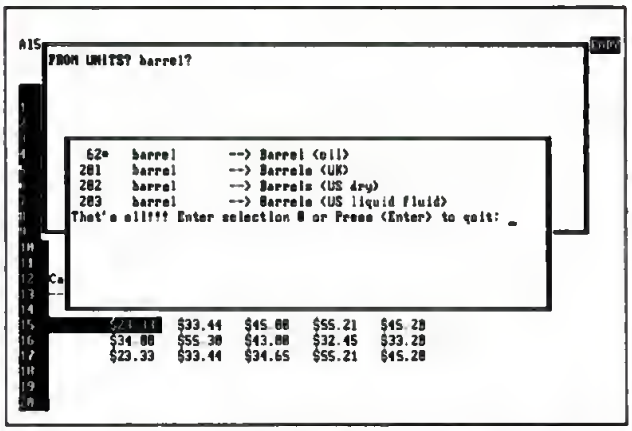
*CanvertR* works with only a handful of those kind of units, the ones included in its database of 200 conversion factors.

While the *Unit*Assistant*'s standby conversion power is handy, its two-handed "hot key" combination (Alt-=) is an inconvenience. The combination of Alt and a neighboring key would make summoning *Unit*Assistant* an easier task.

Otherwise, *Unit*Assistant* is a useful tool for anyone who wants conversion capabilities at a moment's notice.

**List Price:** *Unit*Assistant*, $75. **Requires:** 256K RAM, DOS 2.0 or later. Not copy protected. Thermal Systems Analysis Inc., P.O. Box 193, Broomfield, CO 80020; (303)-469-8507.

CIRCLE 437 ON READER SERVICE CARD




*A unit of measure may have more than one meaning.* Unit*Assistant's *help window specifies the various definitions to choose from.*

# Jot! Simplifies Text-Only Macros

PC HANDS ON

BY PEGGY GAVAN

For those times when your keyboard seems to be following familiar patterns, *Jot!* is a shortcut. This memory-resident utility lets you define macros for frequently used words and phrases, names and addresses, or up to 4,000 characters of text. Then as you type, *Jat!* will insert your macros into their full text.

Using *Jat!*'s Lift feature, you can also pull text from other applications, assign a macro to it, and transfer it to a word processing file without retyping.

Compared with the more-sophisticated macro processors like RoseSoft's *ProKey* and Borland's *SuperKey*, *Jot!* is merely a toy. The program's macros cannot use keys in their shift states (its macros can be defined only by one- to eight-letter abbreviations). You cannot create macros to execute commands, and you can use *Jat!*'s macros only with word processors. In sum, *Jot!* is not for the power user.

However, *Jat!* is extremely easy to use, and its documentation is written in a tutorial style perfect for computer neophytes. So if you are looking only to increase your typing speed by eliminating repetitive keystrokes, *Jat!* will get the job done.

*Jat!* requires a minimum of 31K RAM, but it will make use of EMS, cutting it to 3K.

*Jat!* is precustomized to work with some popular word processors—*WardStar*, *WardPerfect*, *Microsaft Ward*, and *Multimate*—but with *Jat!*'s Options feature and some testing on your part, you can customize *Jat!* to work with most other programs. I set up the program to work with *XyWrite*, *PFS:Write*, and *PC-Write* in minutes with no hitches.

**List Price:** *Jot!*, $49.95. **Requires:** 31K RAM, one disk drive, DOS 2.0 or later. Does not support the IBM EGA. Not copy protected. Beacon Software International, 120 Fulton St., Boston, MA 02109; (800) 628-2828, ext. 565.

CIRCLE 438 ON READER SERVICE CARD

# Need Help Screens? Call Rescue

PC HANDS ON

BY CATHERINE D. MILLER

Some programs do not provide much in the way of on-line help; other programs are run so infrequently that you can forget how to use them. *Polaris Rescue* can make life easier by allowing you to develop your own pop-up help screens for just about any application or procedure that is performed on-line.

You can import ASCII text files once you've marked off the text to be used in a screen. Each *Rescue* file can hold up to 1,000 interconnected help screens.

The Edit menu lets you customize your screens. You can use word wrap, 16 colors, all the IBM screen graphics characters, and draw lines, but you cannot reduce the size of a help screen.

### One Help File

Because you have the capability to point from each screen to 30 other screens in a file, you can include help screens for all the applications that you use in one help file. By using your first screen as a menu, you can pop up a loaded help file (by using a "hot key" that you define) and then access the screens you need for the application you are running.

With *Palaris Rescue* you can create an extensive network of great-looking help screens. Anyone who's developed a reputation around the office as an expert in a particular program may find *Rescue* is the easiest way to distribute that often-sought knowledge.

**List Price:** *Polaris Rescue*, $149. **Requires:** 289K RAM, two disk drives, DOS 2.0 or later. Not copy protected. Polaris Software, 613 W. Valley Pkwy., #323, Escondido, CA 92025; (619) 743-7800.

CIRCLE 439 ON READER SERVICE CARD

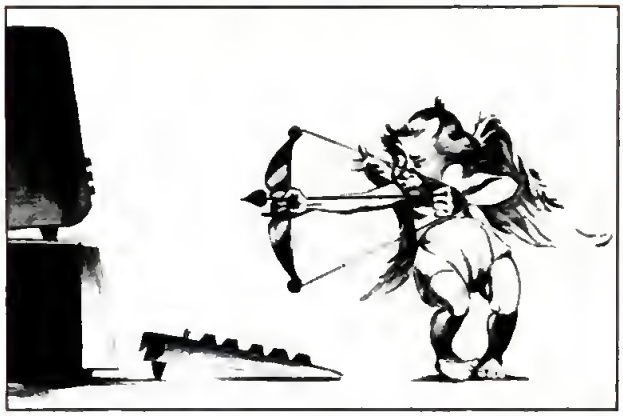
## ■ COMMUNIQUÉS ■ EDITED BY BILL HOWARD

### It Sounded Better The First Day

ACCOUNTANT
We are a real estate and direct sales marketing company. The position is a permanent one. The office is located in Lago Vista on Lake Travis. Preference will be given to those with a strong sex background in filing consolidated reports, etc. We have a Wang 2200 and an IBM AT computer . . . . After initial interview, you'll be tested by our CPA sex specialist on sex reporting ability. There is substantial opportunity for growth within this position.

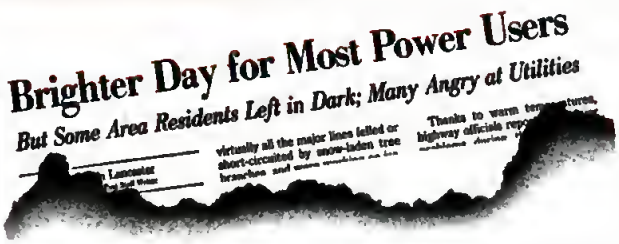
—Austin American-Statesman, *March 11, 1987. Two days later the same ad ran with the word* sex *replaced by* tax.

### Accountant? Want to Settle Down? May We Suggest Relocating to Texas



SWF, 32, ACCOUNTANT/PC PROGRAMMER seeks husband. Must be under 40 and own computer. If interested, please send photo of computer. CM Box M2223.

—*Personals*, Cincinnati *magazine, March 1987*




*With all the 386 machines and laser printers, we cauldn't agree with this* Washington Post *headline more. Now if all those TSRs would stop crashing.*

### Mis-Fortune 500

"[Borland International's] hot-selling Turbo Pascal, which allows personal computer owners to write specialized programs for, say, laying out a newspaper page, retails for $100, or 71% less than Microsoft's competing product."

—Fortune, *March 16, 1987*

### Imagine a Printer This Fast . . .

The QuadLaser printer "handles heavy use (10,000 pages a minute) and multiple users easily."

—*Corporate Solutions of America flier.*

### . . . and with This Much Resolution

"The 400-character-per-inch dot-matrix printers, which IRS planned to install last month, will eliminate one step in the process of reviewing the data keyed into IRS Motorola Inc. Four-Phase computers."

—Government Computer News, *February 13, 1987*

*Heard or seen anything unusual about the PC industry? Send your offerings to Communiqués,* PC Magazine, *One Park Avenue, New York, NY 10016. Contributors get $50 and a T-shirt. Winners this issue: Michael Rhoades (sex/tax accountant), Jan Koenig (SWF), Howkins Dale (QuadLaser), Alan Smith (400-cpi printer), Stephen Moore (brighter day), Edward Strouss (Virginia Dragoon), Daug McGinnis (Osborne 1), Alice Porker (haze modem), B.R. Holt (Micro-Soft mauth), Kurt Garham (mass coprocessor), Robert Callaghan (higgy term).*

### Classified Intelligence

**Computers**

VIRGINIA Dragoon 44 Magnum, 7½ inch barrel, $190. xxx-xxxx.

—The Daily Progress, *Charlottesville, Va., February 5, 1987*

Osborne 1, port. computer. Exc. word processor, much software! A/C, 47K mi, FM, tan, $2700 obo. Dayl Fowler xxx-xxxx (Mach).

—The Santa Barbara *(Calif.)* Independent Paper

DEC Rainbow 100 256K, printer, lotus 123, haze modem & software $1500 xxx-xxxx.

—Oklahoman & Times, *February 2, 1987*

IBM PC, XT, AT Software, new and use, Micro-Soft mouth, Olivetti printer, xxx-xxxx.

—The Thrifty Nickel, *Boise, Idaho, February 19, 1987*

IBM PC portable, 20mb hard disk, mass co-processor, color graphics, and more. New one on way. xxx-xxxx, Mike.

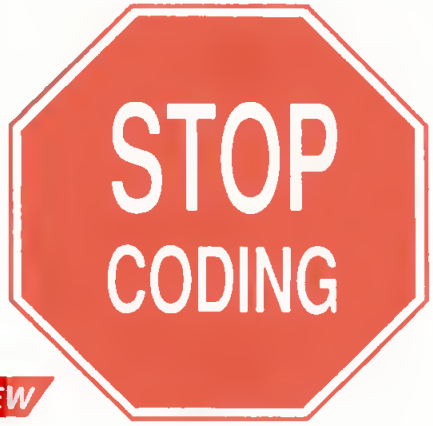
—Lexington *(Ky.)* Herald-Leader, *February 10, 1987*

COMMODORE MODOM 300—with higgy term and quantim link, $39. Call xxx-xxxx.

—The Saginaw *(Mich.)* News, *February 21, 1987*

Illustrations: Frank Marcuiuano (man with bow) Martha Gradisher (Cupid and printer)

# dBASE USERS!




NEW

## with QUICKCODE PLUS™

Let's face it. Coding is a waste of time. Why should *you* have to work hard just to get dBASE to do what you want?

You shouldn't. And now you don't.

Let QUICKCODE PLUS do it *for* you. QUICKCODE PLUS is a *complete* application generator which automatically writes your dBASE programs. Design any kind of screen using the built-in Form Editor. Then, use lightning-fast 1-2-3™ style commands to tell QUICKCODE PLUS all about your application (files, fields, computations, menus, etc.).

After that, just sit back and watch as QUICKCODE PLUS produces some of the best dBASE programs you've ever seen. Modular, standardized, highly commented code which you can easily modify.

And we're not talking about limited "skeleton" programs which you could easily write yourself. These programs are comparable to those written by a dBASE expert.

Can you imagine how much easier your work would be if you had QUICKCODE PLUS? Order it now and STOP wasting time!

**QUICKCODE PLUS features:**

**Forms:** Maximum size = 11 pages; maximum number of fields = 512.

**Data Types:** Character, Money, Date, Integer, Numeric, Telephone, Soc Sec, Logical, Memo.

**Field Types:** Protected or Non-Protected, DBF or Memory, Display or Non-Display, User Defined

**Validation Types:** Range, List, File, and any formula allowed in dBASE

**Computations:** Anything allowed in dBASE, performed on screen as you enter or change data.

**Supplied Programs:** General purpose LOOKUP and UPDATE programs included as dBASE source code. Use them in any application.

**Linked Files:** Link up to 5 databases together on one form using relations.

**Menu Generator:** dBASE programs or high-speed QUICK MENUS.

**Advanced Form Editor:** Specifically designed for building database forms.

**Printer:** Use **BOLD**, *ITALICS*, etc.

**Customization:** Many features

Requires dBASE III PLUS and 384K RAM

NOW 100% CLIPPER COMPATIBLE

## with QUICKREPORT™

Not getting enough mileage out of your dBASE reports? Is REPORT FORM too *weak* and programming it yourself too *slow*?

Then it's time to switch to something a lot stronger . . . QUICKREPORT.

QUICKREPORT is the dBASE report writer you've always wanted. The one which lets you design reports in seconds simply by drawing them on the screen without any programming.

No longer are you limited to one line per record. Put text and data anywhere you like (including computed fields, totals, averages, etc.)

No longer are you limited to one database per report. With QUICKREPORT, you can link together up to 6 databases and use such powerful features as file chaining and transaction processing.

You can also sort, group, and total data on up to 16 fields, with unique headers/footers for each page and each break group. And use printer features like **BOLD** and *ITALICS*.

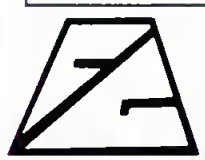
QUICKREPORT gives you plenty of power. But its user interface is so friendly that PC Magazine called it "elegant." So while you're using all that power, *you* can take it easy.

And isn't that what computers are for?

**What the Critics Say:**

*"Quickreport is elegant."*
PC Magazine

*"Quickreport from Fox & Geller is a top-notch report generator that's easy to learn and operate . . . a furlong ahead of dBASE."*
PC World



**Fox & Geller**
604 Market Street
Elmwood Park, NJ 07407
FOX & GELLER (201) 794-8883 Telex: 311256

CIRCLE 246 ON READER SERVICE CARD

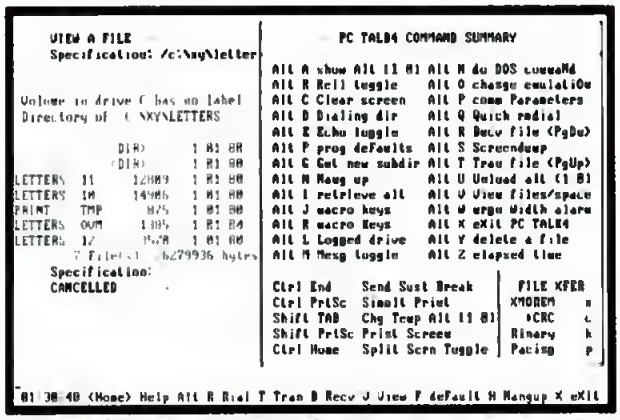
QUICKCODE PLUS and QUICKREPORT are trademarks of Fox & Geller. dBASE III PLUS is a trademark of Ashton-Tate. 1-2-3 is a registered trademark of Lotus Development Corp.

## ■ PC UPDATE ■ PEGGY GAVAN

Compaq Computer Corp. has replaced its **8-MHz Deskpro 286** with a faster, more powerful version of the same machine. The new **Deskpro 286**, running at 12 MHz, is up to 50 percent faster than the 8-MHz system, though a dual-speed processor allows you to switch back to 8 MHz for applications that require the slower operating speed. The new system board provides up to 2.1 megabytes of RAM, leaving up to seven full-height expansion slots free for other requirements. The Deskpro 286 Model I, which features 256K RAM and one floppy disk drive, retails for $2,999. The Model 20, featuring 640K RAM, one floppy disk drive, and a 20-megabyte hard disk, sells for $3,999. The Model 40 has a suggested retail price of $4,999. Compaq Computer Corp., Houston, Tex.; (713) 370-0670.

* * * * *

Headlands Communications Corp. has introduced ***PC-Talk4***, a commercial version of its popular communications software program that's intended to replace its ***PC-Talk III*** shareware program. *PC-Talk4* will be sold through retailers and distributors. The new version has a variety of new features, including the XMO-




*The commercially marketed* PC-Talk4 *retains the structure of its shareware predecessor but adds new features, including the DOS Shell Command and macro functions.*

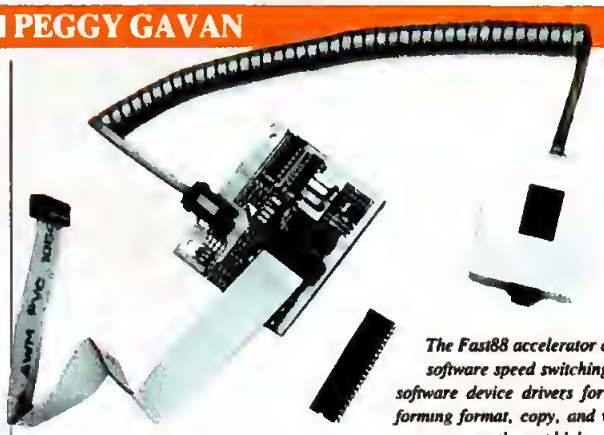
DEM.CRC error-checking protocol and screen emulation of VT100/52, as well as TTY terminals, expanded macro capabilities, and an expanded dialing directory. In addition, users can access DOS commands and subdirectories and run other applications while *PC-Talk4* remains active. The program will retail for $129 following a limited introductory price of $99. Registered users can upgrade for $45. Headlands Communications Corp., Tiburon, Calif.; (415) 435-0770.

* * * * *

Toshiba America has reduced the prices on its **T3100** and **T1100 Plus** portable personal computers by $300. The AT-compatible T3100, equipped with 640K RAM, a 10-megabyte hard disk, and one 720K-byte disk drive, is now $4,199. The T1000 Plus, which features a supertwist liquid crystal display, two disk drives, and an 80C86 microprocessor, is now priced at $2,099. In addition, Toshiba has discontinued the 256K RAM model of the T1100 Plus. Toshiba America Inc., Irvine, Calif.; (714) 583-3000.

* * * * *

MicroSpeed has released an enhanced version of its **Fast88** PC accelerator board intended to eliminate hardware and software compatibility problems. The new version offers software speed switching for 6.1, 6.7, and 7.4 MHz and has software device drivers that allow users to do format, copy, and verify operations at high speeds. The Fast88 is $129 with software speed switching or $149 with optional hardware speed switching. Current owners can upgrade for $50 by returning their old board to MicroSpeed in Fremont, Calif.; (415) 490-1403.



*The Fast88 accelerator offers software speed switching and software device drivers for performing format, copy, and verify operations at high speeds.*

ButtonWare has added both speed and enhancements to its ***PC-File*** database with the release of ***PC-File Plus***. The new version of *PC-File* has more than 175 help screens, plus global search and update, password protect features, and a report writer. *PC-File Plus* also supports nested calculations and allows users to mail merge form letters and paint entry screens. Upgrades to the $69.95 program are $25 for all registered users. ButtonWare Inc., Bellevue, Wash.; (206) 454-0479.

* * * * *

Xerox Corp. has added 80 new features to Version 1.1 of its ***Ventura Publisher*** desktop publishing program. Some of the features include new graphics converters that support 500 graphics software programs and compatibility with Hewlett-Packard soft fonts, Hewlett-Packard fonts on a disk, and Adobe Systems' PostScript downloadable fonts. The price of *Ventura Publisher* remains at $895; upgrades are $100 for current owners. Xerox Corp., Lewisville, Tex.; (214) 420-7200.

* * * * *

PCC/Systems has announced a new pricing for its ***cc:Mail for LANs***, a high-end electronic messaging product. The *cc:Mail* starter package (10 users) dropped $200 in price, to $795, and now includes cc:*Mail Notify*, a RAM-resident message notifier. The 5-User Expansion Kit for *cc:Mail* was reduced $55, to $395, and the 25- and 100-User Expansion Kits have been replaced by an Unlimited User Expansion Kit, priced at $2,495 per server. PCC/Systems, Palo Alto, Calif.; (415) 321-0430.

* * * * *

***Instant Replay***, Version II, has several new features, including a music and sound maker, an automatic slide generator, exploding pop-up windows, and a more powerful keystroke editor. The price of ***Instant Replay II*** is $149.95, an increase of $60. Current users can upgrade by returning the original disks along with $50. Nostradamus Inc., Salt Lake City, Utah; (801) 487-9662 . . . Blue Chip Electronics has reduced the price of its Hyundai-built PC-XT compatible by $100, to $599. Blue Chip Electronics Inc., Chandler, Ariz.; (602) 961-1485 . . . Lexisoft's ***Spellbinder Desktop Publisher***, Version 6.3, has several new features, including a font catalog with pull-down selection menus and additional laser print drivers for PostScript devices, the Cordata LP-300X, the HP Laserjet line, and compatibles. Registered users of Versions 6.1 and 6.2 can upgrade for $75. Lexisoft, Davis, Calif.; (916) 748-3630 . . . Sigma Designs has cut the prices on its **Color 400**, **Sigma EGA1**, and **EGA 480** graphics adapter boards. The price of the Color 400 was cut almost $200, to $499, and the price of the Sigma EGA! dropped nearly $100, to $399. The EGA 480 now costs $499, a reduction of $100. Sigma Designs Inc., Fremont, Calif.; (415) 770-0100 . . . Tseng Laboratories has reduced the prices of its **EVA** and **EVA/480** EGA boards by $100, to $399 and $580, respectively. Tseng Laboratories Inc., Newtown, Pa.; (215) 968-0502. PC

# MAXIMIZE YOUR MULTISYNC™

**Lots of EGA boards will take you this far.**

**A few will take you to here...**

**But now you can maximize your MultiSync— with Genoa's SuperEGA™...**

**and SuperEGA HiRes,™ both with AutoSync™!**

| 15.75 KHz | 18.75 KHz | 21.8 KHz | 30.0 KHz | 31.5 KHz | 35.0 KHz |
|---|---|---|---|---|---|
| CGA 320 x 200 | MDA (Hercules) 720 x 348 | EGA 640 x 350 1056 x 352 132 col. x 44 | PGA resolution 640 x 480 Drivers for: Lotus 1-2-3, AutoCAD, GEM, Windows, and Desktop Publishing | CGA DoubleScan: 320 x 400 640 x 400 | CAD/CAM 800 x 600 Drivers for: AutoCAD, Windows, GEM, and Desktop Publishing |

Now you can maximize your MultiSync monitor—with a SuperEGA card from Genoa. SuperEGA gives you CGA (including double-scan!), MDA (Hercules), EGA, and PGA resolution—and 132 columns. Or you can get the SuperEGA HiRes card for your advanced CAD/CAM and desktop publishing applications.

Both SuperEGA cards feature AutoSync: they automatically synchronize with all MultiSync speeds, from 15.75 up to 35 KHz.

The SuperEGA HiRes is the *only* EGA board with 800 x 600 resolution, and it comes with the drivers you need for CAD/CAM and desktop publishing.

For all your graphic applications, you can count on SuperEGA. We've maximized the MultiSync!

Call or write: Genoa Systems Corporation, 73 E. Trimble Road, San Jose, CA 95131; Telephone: 408-432-9090, FAX: 408-434-0997, TELEX: 172319

CIRCLE 239 ON READER SERVICE CARD

Genoa SYSTEMS CORPORATION

© 1987 Genoa Systems Corporation. SuperEGA, SuperEGA HiRes and AutoSync are trademarks of Genoa Systems Corporation. MultiSync is a trademark of NEC Home Electronics. Lotus 1-2-3—Lotus Development Corporation; Hercules—Hercules Computer Technology; Windows—Microsoft; GEM—Digital Research, AutoCAD—AutoDesk, Inc.

# Every good b a double

The corporation wants power.
Individuals want ease-of-use.
Put those two qualities in a single database and what have you got?
The overwhelming industry standard.

And the standard that won't overwhelm individuals.
dBASE III PLUS™ from Ashton-Tate.®

*The Industry Standard*

More corporations choose it than all the other databases combined. Because they want broad compatibility across the whole company. And true networking capability. And the opportunity to unify their support and training resources. In short, they want one product that's flexible and powerful enough to meet the needs of all.

And with dBASE III PLUS, they get it all. Plus the broadest third-party support in the industry. You see, more applications are written for dBASE® than for any other database. So in many cases, the applications you need are already available.

More individuals choose dBASE as well.

Because we've made it easier for individuals to use. Particularly the sort who get queasy when they think they might have to program.

They can start using dBASE without

# usiness needs standard.

*The Individual's Standard*

any programming experience. Because the Assistant feature, with its pull-down menus, guides them step-by-step through the creation and use of a database.

When they're ready to create applications, our Applications Generator writes the code.

And to make the complex even simpler, we have catalogs that let them recall relationships among files with a single command. Complex commands can also be stored for automatic use by our "history" capability.

Best of all, we've added these ease-of-use features without alienating the people who made dBASE the industry standard in the first place. The advanced users and programmers. Who still get all the power and programming features they need to develop their sophisticated applications.

So if you're looking at databases from either the corporate or the individual perspective, your choice is simple.

dBASE III PLUS.

Or dBASE III PLUS.

For the authorized Ashton-Tate dealer nearest you call (800) 437-4329, Ext. 284.*

ASHTON·TATE®

*In Colorado and outside of the U.S. call (303) 799-4900 Extension 284 Trademarks/owner: dBASE, dBASE III PLUS, Ashton-Tate/Ashton-Tate © 1986 Ashton-Tate All rights reserved

CIRCLE 208 ON READER SERVICE CARD

# smarterm®

## The Next Evolutionary Step in Communications Software

**In the world of communications, the result of natural selection isn't always "terminal".**

You can access your mini computer using standard terminals. But the smarter alternative is an IBM* compatible PC and SmarTerm terminal emulation software—an advanced species of communications software.

Persoft began where most terminal emulation software companies strive to end—with exact, feature-for-feature emulation. Then Persoft took SmarTerm software to the next stage of evolution: superiority.

SmarTerm 240, the latest in the SmarTerm series, not only provides the ReGIS* and Tektronix* graphics capabilities of a DEC* VT240* terminal, but adds capabilities that are only possible through the power of a PC.

Features like error-free data transfer (using Kermit or XMODEM protocols) and programmable softkeys. And now with the new add-on network kit, you can communicate through several popular networks.

SmarTerm 240 is just one example of the most advanced line-up of DEC, Data General* and Tektronix terminal emulation software in the industry.

Make the "natural selection." Ask your local dealer about SmarTerm terminal emulation software. Or contact:

Persoft, Inc.
465 Science Drive
Madison, WI U.S.A. 53711
(608) 273-6000
Telex 759491

VISIT BOOTH 3244
WEST HALL
COMDEX/ATLANTA

DEC Emulation - Inquiry # 365
DG Emulation - Inquiry # 366

persoft®

**SmarTerm Terminal Emulation Software**
**. . . The Natural Selection**

*Persoft and SmarTerm are registered trademarks of Persoft, Inc. IBM is a registered trademark of International Business Machines, Inc. DEC, VT and ReGIS are trademarks of Digital Equipment Corporation. Tektronix is a registered trademark of Tektronix, Inc. © Persoft, 1987. All rights reserved.

■ FROM THE EDITOR'S SCREEN ■ BILL MACHRONE

# REPORT FROM THE FRONT

*An editor's life on the road isn't always an easy one. Dropping in at local PC user group meetings along the way is a refreshing and enlightening diversion.*

User groups are where the action is. PC users have joined forces in an incredible network of instruction, assistance, and camaraderie. Before your prejudices kick in, pay attention: if you have an image of user group members as introverted adolescents with bad complexions, wreaking havoc in the dead of night on distant data centers from their ill-lit bedrooms, you're way out of line.

User groups are *business* organizations, with members like you and me. They meet in every large city, and a lot of smaller ones, too. They exist to be hands-up-the-ladder, to share knowledge, to overcome the tremendous hurdles of becoming a PC virtuoso. They publish newsletters full of software reviews, ads from local sources, industry news, and programming tips. They have disk librarians who distribute shareware and public-domain software. They sponsor guest speakers and product demonstrations.

User groups come in all sizes. Most have one or two hundred people at a meeting. Some are lunch meetings of 15 or 20 local infocenter managers. And a rare few are enormous: HAL-PC in Houston gets over a thousand at a typical meeting, and a few others approach it in size.

I make it a point to visit at least one user group per month, all over the country. It's essential to maintaining perspective on the end user's concerns. It would be all too easy to sit in our offices in New York and get a thoroughly distorted view of the industry: the latest software, the fastest machines, the biggest companies, the sexy products. Life at the top of the food chain is interesting, but you have to get back to basics. It's all very well to say that everyone should be running an 80386 at 16 MHz, but a surprising number of infocenter managers and purchasing departments are just coming around to the idea that hard disks on individual machines might speed operation and aid productivity.

**RANDOM ACCESS** Most user group meetings include a "random access" session in which members ask questions. It's rare that someone in the room doesn't know the answer or have a well-founded opinion. Questions usually center on what's the best software for a 5,000-name mailing list, or if anyone has a *1-2-3* macro that hides and unhides specific cells. Esoteric questions about the inner workings of BIOS are uncommon.

The answers can be entertaining, too. In the instance of the mailing list, one member suggested *dBASE III*. Several others claimed that it was too complex, and overkill for the intended application. When the furor died down, he continued, saying that he had written such an application in *dBASE* and would gladly share it with anyone who needed it. That's part of the spirit and pleasure of user groups.

Manufacturers have discovered user groups. The more savvy among them demonstrate new products at meetings. They get good feedback, arrange group purchases, and get terrific word-of-mouth advertising. They also use members as beta testers and focus groups to help them design new products.

Consumerism is alive and well in user groups. Some natural leaders have emerged, such as Capital PC's Jerry Schneider. He has spearheaded a long, patient, well-reasoned attack on copy protection. Schneider's lobbying has sensitized manufacturers and the trade press to the problem, and has galvanized individuals and companies into action. User groups, through meetings, newsletters, and interaction with the manufacturers, have been heard. The results speak for themselves.

At the heart of the user group's success is the SIG, or special interest group. A typical roster of SIGs would include beginners, spreadsheet, database, communications, accounting, and programming. In larger groups, they subspecialize into specific products. The larger ones get special support from manufacturers, and are often consulted on potential features for new versions of the product.

Beyond SIGs, user groups will often conduct instruction in one or more phases

Illustration: Jennifer Scopp

## ■ FROM THE EDITOR'S SCREEN

of PCdom. Classes in DOS, programming languages, spreadsheets, and databases are common. The most amazing thing about all of this is that, beyond the group's nominal membership fee, all of it is free, and is based upon volunteer work.

In-house user groups are a phenomenon unto themselves. They share most of the attributes of public groups, except that big companies sponsor them for the benefit of their employees. They also tend to focus more on the company's business. A publishing company's user group spends a lot of time on word processing and composition systems; a research and manufacturing firm dwells on scientific and engineering applications.

**LOADED QUESTIONS** I'm often a guest speaker at user group meetings, as are other *PC Magazine* staffers. We're always struck by the perceptiveness of the questions we're asked and their applicability to the real world. Of course, they want to know what works best, and which technologies have a future and which don't. One question we always get, however, is how relevant we think user groups are. I hope this ode dispels all doubt. Until computers become as easy to use as toasters, user groups will be relevant.

The questions can be surprising, too. I recently spoke before the the Twin Cities PC group in Minneapolis. The meeting was appended to a local business trade show. Many of the popular vendors had booths, and local VARs and retailers were well represented. The questions ran the gamut of future operating systems, the relevance of 80386 machines, software fitness for purpose, and the ins and outs of magazine publishing. Toward the end of the evening a young man, looking uncomfortable in his tweed jacket and tie as only an adolescent can look, asked, "Don't you find John Dvorak to be a disruptive and divisive influence in *PC Magazine*? Why did you hire him, anyway?"

After the laughter died down, I told him that I didn't usually explain or apologize for *PC Magazine*'s columnists, but that Dvorak was enough of a special case to require a reply. Dvorak, I said, was integral to *PC Magazine*; there was real depth behind his acid wit and churlish attitude. I also pointed out that Dvorak's favorite target was dumb ideas, not people. Dvorak makes sport of institutions, not individuals, unless individuals set themselves up as institutions. Furthermore, it's rare to find a columnist of any stripe who cares as much about the industry and the products. Then I told a few Dvorak anecdotes—and now this is a Dvorak anecdote.

It was a great meeting. You could've been there. See you at the next meeting?


*PC BRAND PRESENTS*

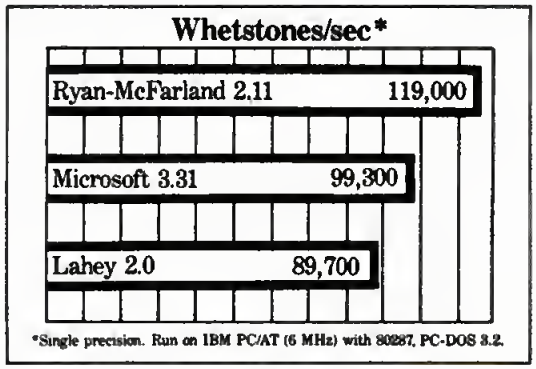
**RYAN-McFARLAND'S KILLER FORTRAN.**

Choose your yardstick and, no matter which, RM/FORTRAN™ blows the others away.

Sieve? RM/FORTRAN runs 26% to 228% faster.

Whetstones? RM/FORTRAN is 20% to 33% better.

Those aren't benchmarks Ryan-McFarland picked to make their FORTRAN look good. They're the industry standards.



*Single precision. Run on IBM PC/AT (6 MHz) with 80287, PC-DOS 3.2.

RM/FORTRAN™ is a complete implementation of FORTRAN-77 (ANSI X3.9-1978), the only PC FORTRAN certified by the General Services Administration at the highest test level. The reason: it's a big mainframe compiler moved to PCs, with the bonus that mainframe and mini applications can wander between environments.

Now, on your PC, you can develop large applications, with programs up to 640k (bigger using overlays), arrays over 64k, and using a long list of VS, VAX and FORTRAN-66 extensions you may have grown fond of— long symbolic names, "include", IRT bit functions—because Ryan-McFarland has left out nothing.

But what really sets RM/FORTRAN apart is optimization. The compiler reduces the number of instructions to the minimum which will actually execute, and even takes advantage of each processor's features to deliver lightning-fast object code. It runs 30%-40% faster than Microsoft 3.2, and could make using a mainframe for speed no longer worth the trouble.

Comes with an interactive symbolic debugger like that accompanying IBM VS FORTRAN, Plink86 subset, has a cross reference compile option, supports assembler and C subroutine calls, IEEE floating point, 8087 and 80287 chips.

"Compiler's documentation, ease of use, speed of execution, and debugger facilities place it first for recommendation" said the *Tech Journal*.

Ryan-McFarland has been writing FORTRAN compilers for IBM, DEC, etc. for 20 years. So if FORTRAN's superiority for scientific and engineering applications is your need, there is no greater expert. List $595 PC Brand: Call

For Orders or Literature, Call Us at...

**800 PC-BRAND**

That's (800) 722-7263.
In NY State call (212) 242-3600
PC Brand, 150 5th Ave.
New York, N.Y. 10011-4311
Telex 667962 (SOFT COMM NYK)

©1987 PC BRAND
Prices, terms, and specifications subject to change without notice.

CIRCLE 144 ON READER SERVICE CARD

# ONLY OUR SOFTWARE IS COMPATIBLE WITH ALL THIS HARDWARE.

Of all the data management software in the world, only one is compatible with the hardware shown here.

And it isn't dBASE III Plus.™

It's R:BASE® System V. The data management software that delivers the combination of power and ease of use that others can't touch—so you can achieve results in hours, not months.

Visit your Microrim® dealer today. For the name of your nearest dealer, or to order a Trial Pack ($19.95, plus shipping) call 1-800-547-4000 and ask for department 829. In Oregon or outside the U.S., call 1-503-684-3000, department 829.

You'll see that our software is compatible with the hardware above, because it's designed to be compatible with you.

**R:BASE SYSTEM V**
**MICRORIM**

Trademarks/Owners: R:BASE System V, Microrim/Microrim, Inc.; MS-DOS/Microsoft Corporation; dBASE III Plus/Ashton-Tate Corporation; datapro/Datapro Research Corporation; PC Magazine/Ziff Communications Company; InfoWorld/CW Communications, Inc.

# Silicon Specialties

## 1-800-354-7330

**FREE** AIR EXPRESS SHIPPING — You Pay The Ground, We Pay the Air

**$346** *With System A or B Only*

**MIT SYSTEMS TURBO PC/XT**

256K Memory, 360K Brand Name Floppy Drive, 135 Watt Power Supply Slide Case, AT Style Keyboard, 4-8MHz Clock Speed, (Keyboard Selectable), 8 Expansion Slots

**$999** *With System C or D Only*

**MIT SYSTEMS PC/AT**

6-10 MHz Switchable, 512K RAM Expandable to 1MB on Motherboard, a 1.2MB Floppy Drive, 192 Watt Power Supply, Dual Hard Drive & Floppy Controller Card, AT Style Keyboard and clock/calendar with Battery Back-up.

| SYSTEM A | SYSTEM B | SYSTEM C | SYSTEM D |
|---|---|---|---|
| MIT XY Monochrome System<br>MIT Turbo XT<br>MIT Monographics Card<br>*With Printer Port*<br>MIT Amber Monitor<br>*With Swivel Tilt Stand*<br>MIT I/O Serial/Clock Card<br>MIT 4 Outlet<br>*Surge Suppressor* | MIT XY Color System<br>MIT Turbo XT<br>MIT Color Card<br>*With Printer Port*<br>MIT RGB Color Monitor<br><br>MIT I/O Serial/Clock Card<br>MIT 4 Outlet<br>*Surge Suppressor* | MIT AT Monochrome System<br>MIT 10 MHz AT<br>MIT Monographics Card<br>*With Printer Port*<br>MIT Amber Monitor<br>*With Swivel Tilt Stand*<br>MIT AT Multi I/O Card<br>MIT 4 Outlet<br>*Surge Suppressor* | MIT AT Color System<br>MIT 10 MHz AT<br>MIT Color Card<br>*With Printer Port*<br>MIT RGB Color Monitor<br><br>MIT AT Multi I/O Card<br>MIT 4 Outlet<br>*Surge Suppressor* |

Turbo PC/XT w/640K & 1 Drive ***with System Order Only*** . . . . . $ 379
Turbo PC/XT w/640K & 2 Drives ***with System Order Only*** . . . . . $ 456
Turbo PC/XT w/640K & 1 Drive & 20 MG ***with System Order Only*** . . . . . $ 749
PC/AT 10 MHz w/1024K, 1.2 Floppy Drive ***with System Order Only*** . . . . . $1065
PC/AT 10 MHz w/1024K, 1.2 Floppy, 30 MG ***with System Order Only*** . . . . . $1645

# Hardware

### PRINTERS

Alps
All Models . . . . . Call
Brother Printers . . . . . Call
Citizen Printers
MSP-10 . . . . . $ 269
MSP-15 . . . . . 359
MSP-20 . . . . . 309
MSP 25 . . . . . 459
Premier 35 . . . . . 445
120D . . . . . 169
Diablo D-25 . . . . . 469
635 . . . . . 759
Dycomics
150 . . . . . $ 299
Epson Printers . . . . . Call
NEC
3510, 3550 . . . . . 729
8810, 8850 . . . . . 1045
P-6 . . . . . 429
P-7 . . . . . 609
P-9 . . . . . 429
Okidata . . . . . Call
Panasonic
10801 . . . . . 189
10911 . . . . . 245
10921 . . . . . 319
1592 . . . . . 385
1595 . . . . . 465
3131 . . . . . 229
3151 . . . . . 369
Star Micronics . . . . . Call
Toshiba
321 . . . . . 465
341E . . . . . 669
351 Model II . . . . . 1045
351 Color . . . . . 1029

### COMPUTERS

AST
Model . . . . . $1399
Model 120 . . . . . 2099
Model 140 . . . . . 2449
Panasonic
Business Partner . . . . . $ 719
Sr Partner . . . . . 979
Exec. Partner Dual Drive . . . . . 1429
Toshiba
T-1100 Supertwist . . . . . 1399
T-3100 . . . . . Call

### PLOTTERS

Epson HI-80 w/HPGL . . . . . $ 345

### BOARDS

AST
Six Pack Plus . . . . . 149
Hercules
Color Card . . . . . 145
Graphics Card . . . . . 175
Intel
All Above Boards . . . . . Call
Paradise
EGA Autoswitch . . . . . 305
5 Pack . . . . . 99
Plus Development
Plus Hard Card 20 Megabyte . . . . . 609
Quadram
Quad EGA Plus . . . . . 329
Tecmar
Graphics Master . . . . . 409
Captain (No Memory) . . . . . 109
Video-7
Vega Deluxe . . . . . 335
Enhanced Graphic Adaptor . . . . . 229

### MONITORS

Amdek Monitors . . . . . Call
NEC
Multisync . . . . . $ 575
Other Models . . . . . Call
Princeton Graphics Monitors . . . . . Call

### TERMINALS

Qume
101 Plus Green . . . . . $ 315
101 Plus Amber . . . . . 315
Wyse
30 . . . . . 285
50 . . . . . 359
75 . . . . . 565
85 . . . . . 435

### MODEMS

Anchor Automation
Anchor Express . . . . . $ 185
Hayes
All Models . . . . . Call
Prometheus
1200B w/Software . . . . . 129
US Robotics
Password 1200 . . . . . 165
Courier 2400 . . . . . 335
Microlink 2400 . . . . . 249

### DISK DRIVES

Bernoulli Box
10 Meg . . . . . $1195
20 Meg . . . . . 1595
40 Meg . . . . . 2325

# Software

### WORD PROCESSORS

Leading Edge Word Processor . . . . . $ 19
Leading Edge W/P with Spell & Merg . . . . . 32
Microsoft Word 3.1 . . . . . 249
Multimate Advantage . . . . . 299
PFS Professional Write . . . . . Call
Volkswriter 3 . . . . . 136
Volkswriter Deluxe Plus . . . . . 59
Webster New World Writer . . . . . 73
Word Perfect (Ver 4.2) . . . . . 195
Wordstar w/Tutor 3.31 . . . . . 162
Wordstar Pro Pack 3.31 . . . . . 233
Wordstar 2000 2.0 . . . . . 233
Wordstar 2000 Plus 2.0 . . . . . 278

### MONEY MANAGEMENT

Dollars & Sense w/Forecast . . . . . $ 92
Tobias Managing Your Money . . . . . 109

### DESKTOP PUBLISHING

Click Art Personal Publisher . . . . . Call
Harvard Professional Publisher . . . . . Call
Newsmaster . . . . . $ 48
Ventura Publishing . . . . . 575

### DISKETTES

Maxell MZS (Qty 100) . . . . . $ 85
Sony MD-2 (Qty 100) . . . . . 89
Sony 3½ SS, D/D (Qty 100) . . . . . 120

### COMMUNICATIONS

CompuServe Starter Kit . . . . . $ 19
Crosstalk XVI . . . . . 80
Microsoft Access . . . . . 139
Mirror . . . . . 38
Remote . . . . . 80
Smartcom II . . . . . 82

### INTEGRATIVE SOFTWARE

Ability . . . . . $ 55
Enable 2.0 . . . . . Call
Framework II . . . . . Call
PFS 1st Choice . . . . . Call
Smart Software System 3.1 . . . . . 409
Symphony . . . . . Call

### GRAPHICS/MICE

Harvard Presentation Graphics . . . . . Call
IMSI Mouse (PC Mouse) w/Dr Halo II . . . . . $ 92
Microsoft Buss Mouse 6.0 . . . . . 106
Microsoft Chart . . . . . 164
Microsoft Serial Mouse 6.0 . . . . . 119
PC Buss Plus Mouse (New Ver) . . . . . Call
PC Mouse (New Ver) . . . . . Call

### SPREADSHEETS

HAL . . . . . $100
Lotus 1-2-3 Ver 2.01 . . . . . Call
Multiplan 3.0 . . . . . 108
Supercalc 4 . . . . . 269
Twin . . . . . 47
VP Planner . . . . . 47

### DATA BASE MANAGEMENT

Clipper . . . . . $329
dBase III Plus . . . . . 399
DB-XL . . . . . 82
Paradox . . . . . Special Price
PFS Professional File . . . . . Call
Revelation . . . . . 449
R:Base 5000 System V . . . . . 355

### UTILITIES

Brooklyn Bridge . . . . . Call
Carousel 2.0 . . . . . $ 29
Disk Optimizer 2.0 . . . . . 29
Double DOS 4.0 . . . . . 25
Fastback . . . . . 84
Homebase 2.5 . . . . . Call
Microsoft Windows . . . . . 55
Norton Utilities 4.0 . . . . . 48
Note It . . . . . 58
PC Tools . . . . . 19
Sidekick (Unprotected) . . . . . 47

### PROJECT MANAGEMENT

Harvard Total Project Manager II . . . . . Call
Microsoft Project . . . . . $219
Super Project Plus . . . . . 269
Timeline 2.0 . . . . . Call

### LANGUAGES

Basic Compiler (Microsoft) . . . . . $219
C Compiler (Microsoft) . . . . . 249
Cobol Compiler (Microsoft) . . . . . 386
Fortran Compiler (Microsoft) 4.0 . . . . . 249
Genifer . . . . . 188
Lattice C Compiler . . . . . 236
Macro Assembler (Microsoft) . . . . . 84
Run C Interpreter . . . . . 65
Ryan McFarlan Fortran . . . . . 305
Ryan McFarlan Cobol . . . . . 429
Pascal Compiler (Microsoft) . . . . . 166
Quick Basic 2 . . . . . 55
Turbo Jumbo Pack (New Ver) . . . . . 159
Turbo Pascal w/8087 & BCD . . . . . 55
Turbo Prolog . . . . . 54
Turbo Database Tool Box . . . . . 38

VISA — MasterCard

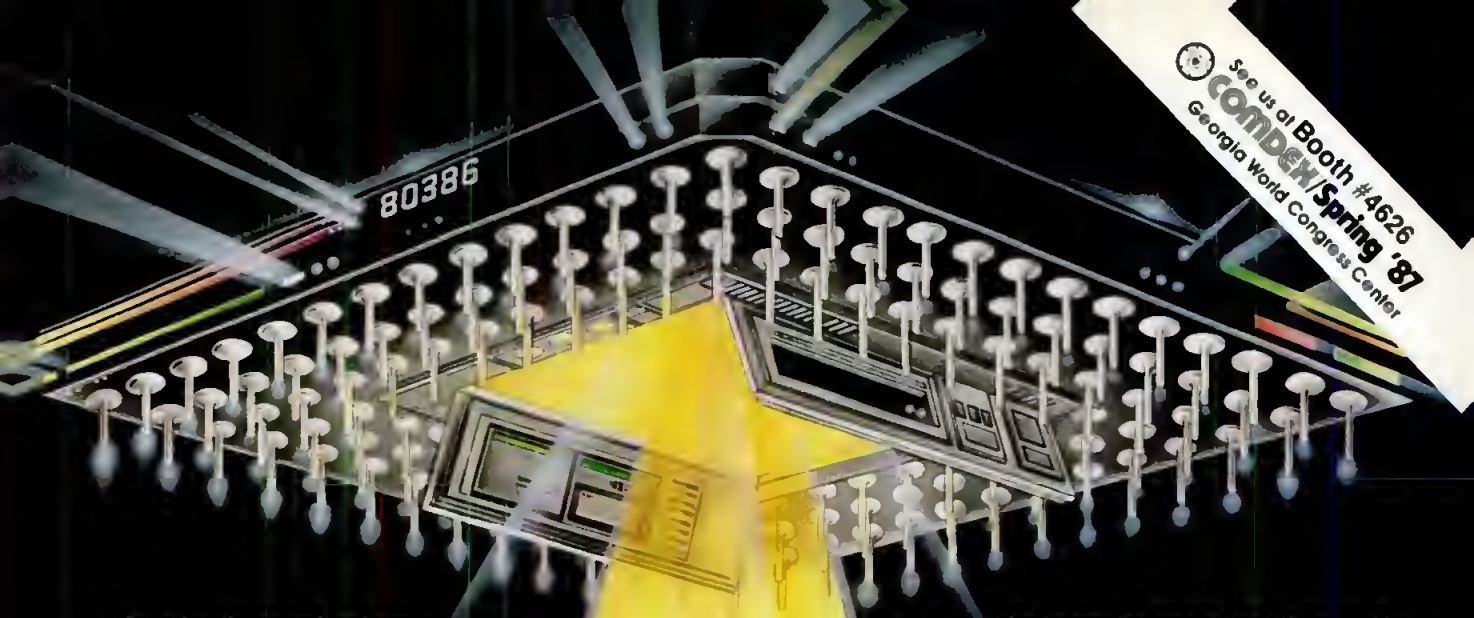
- **No Charge for VISA and Mastercard**
- You Pay the Ground Shipping – We Pay the Air
- Ground Shipping & Handling $6.00
- Free Air Applies ONLY to orders up to 10 lbs & Over $50
- *All product carries a manufacturer's warrantee. Air Guarantees, rebates, trial period priviledges & promotional programs are handled by the manufacturer only.*

- No APO, FPO or International orders, please
- Call before submitting P.O. Numbers
- Personal and Company Checks Will Delay Shipping **2 weeks**
- Prices & Availability Subject to Change Without Notice
- Add 3% for C.O.D. Orders
- **We Do Not Guarantee Machine Compatibility**
- **All Sales Are Final**

Mailing Address:
2222 E. Indian School Rd./Phoenix, Arizona 85016

- Order Lines Mon-Fri. 7a.m.-6p.m.
  Saturday 9a.m.-1p.m
- Order Processing (602) 224-9345
  10a.m-3p.m. Mon.-Fri.

CIRCLE 123 ON READER SERVICE CARD




See us at Booth #4626
COMDEX/Spring '87
Georgia World Congress Center

Imagine the speed and power of a $100,000 minicomputer in a desktop PC costing under $7,000. Now imagine all that power going to waste because the operating system you chose was never meant to take advantage of a computer this powerful. It will take more than just a "window environment" or an outdated operating system to unlock the 80386.

It will take PC-MOS/386.™

**The First 80386 Operating System.** Specifically designed for the 80386 computer, PC-MOS/386™ opens doors. Doors to more memory and multi-tasking. Doors to thousands of DOS programs as well as upcoming 80386-specific software. It's the *gateway* to the latest technology..., and your networking future.

**Memory Management Without Boards.** PC-MOS exploits the memory management capabilities built into the 80386. So, up to four GIGABYTES of memory are accessible to multiple users and to future 80386-specific applications requiring megabytes of memory.

**Multi-Tasking, Multi-User Support for One, Five or 25 Users.** PC-MOS/386™ allows up to 25 inexpensive terminals to be driven by a single 80386 machine. So the features of the 80386 can be utilized at every terminal. And it comes in three versions so you can upgrade your system as your company grows...without having to learn new commands or install new hardware.

**UP TO 25 USERS.**

**MADE FOR THE 80386.**

**RUNS DOS PROGRAMS.**

**MULTI-TASKING**

**Software Support for Thousands of DOS Programs.** Although PC-MOS/386™ totally replaces DOS, it doesn't make you replace your favorite DOS programs. So you can run programs like Lotus 1-2-3, WordStar, dBASE III, and WordPerfect on the 80386. Best of all, it uses familiar commands like DIR and COPY–so you'll feel comfortable with our system.

**The Gateway to Endless Features.** Distinctive characteristics like file/system security, remote access, file/record locking, and built-in color graphics support for EACH user set PC-MOS/386™ apart from all previous operating systems.

**Open the Doors to Your Future TODAY!** Call The Software Link TODAY for more information and the authorized dealer nearest you. PC-MOS/386™ comes in single, five & 25-user versions starting at $195.

**PC-MOS/386™**
**MODULAR OPERATING SYSTEM**

**THE SOFTWARE LINK, INC.**

Developers of LANLink™ & MultiLink® Advanced

8601 Dunwoody Place, Suite 632
Atlanta, GA 30338 Telex 4996147 SWLINK

**CALL: 800/451-LINK**

In Georgia: 404/998-0019
Dealer/OEM Inquiries Invited
Dealers: 404/998-0700 OEMs: 404/641-8554

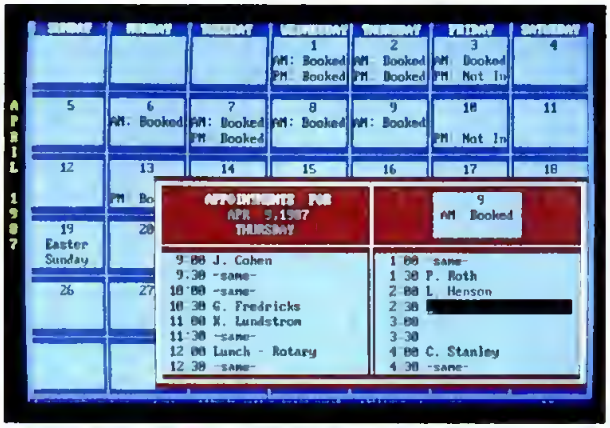
THE SOFTWARE LINK, INC./CANADA
CALL: 416/477-5480

# More Than Just Windows, We've Opened Doors.

TRADEMARK ACKNOWLEDGEMENTS MultiLink® is a registered trademark of The Software Link, Inc. PC-MOS/386,™ MultiLink® Advanced, and LANLink™ are trademarks of The Software Link, Inc. Lotus 1-2-3, WordStar, dBASE III, & WordPerfect are trademarks of Lotus Development Corp., MicroPro, Ashton-Tate, & WordPerfect Corp., respectively. Prices and technical specifications subject to change.

CIRCLE 394 ON READER SERVICE CARD

# BOB STANTON HAD A GREAT IDEA. AN HOUR LATER HE WAS TESTING IT.




Appointments. Everybody takes them — dentists, auto-body shops, dance instructors. And lots of computer applications need appointment screens.

Bob thought that a calendar made a terrific graphic metaphor for taking appointments. Simply use the arrow keys to pick an open date, then press the Enter key, and up pops an appointment window.

Lucky for Bob, he's a CLARION programmer, one of a fast growing cadre of super-productive application developers.

With CLARION's Screener utility, he painted a white calendar on a black background. Then he drew a white-on-blue track around the page and between the days. He typed in the days of the week — and *voila!* — a calendar!

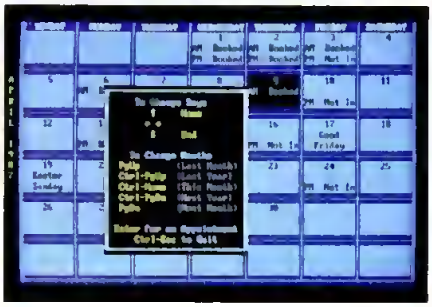
CLARION knows that a PC monitor is refreshed from memory, so it treats a screen layout like a group of variables. Just move data to a screen variable, and it shows up on the monitor.

Bob set up dimensioned screen variables for the days of the month and a screen pointer for selecting a date, and he was done. Then Screener generated the code .

Then Bob drew the appointments window, built an appointment file, filled in the connecting code and tested it — ONE HOUR AFTER HE STARTED!

Testing was a breeze. Screener doesn't just write code, it compiles your source, displays a screen, gets the changes, then replaces the old code in your program.

So here are Bob's appointment screens. You can see the source listing to the right. We marked all the code Screener wrote for him.



## WHY CLARION?

Why are application developers everywhere changing to CLARION?

Because CLARION gives you all the tools you need: a coupled compiler and editor; screen, report, and help generators; an import/export utility; a sort/backup/restore utility; a formatted file dump; a DOS shell — and much more.

Because with CLARION 's comprehensive data management routines, records can be locked and files shared on Novell®, 3COM®, IBM® PC Net & Token Ring, Multi Link®, and most other networks.

Because CLARION is *not* hardware locked or copy protected. Run-time systems are *free* and soon you will be able to translate CLARION into native machine code (.EXEs).

And best yet, the price of CLARION v1.1 is just $395 plus shipping and handling.

You'll need an IBM PC or true compatible with 320KB of memory and a hard disk drive. CLARION v1.1 also comes with a 30-day money back guarantee.

So call now and order CLARION v1.1. or ask for our detailed 16-page color brochure and reprints of major reviews.

**800/354-5444**

CLARION®
*from BARRINGTON SYSTEMS, INC.*

**150 EAST SAMPLE ROAD POMPANO BEACH, FLORIDA 33064 305/785-4555**

Copyright 1986 Barrington Systems, Inc. CLARION is a registered trademark of Barrington Systems, Inc. IBM is a registered trademark of International Business Machines Corporation Novell is a registered trademark of Novell, Inc. 3COM is a registered trademark of 3COM Corporation Multi Link is a registered trademark of Software Link, Inc. Dept. A9

CIRCLE 152 ON REAOER SERVICE CARD

■ JOHN C. DVORAK

# OF MICE AND MEN

*Will the graphical interface overtake the command line? Not until applications programs run fast enough to make mice really useful devices.*

My old buddy and head of Turner-Hall Publishing, Tom Byers, used to enjoy ribbing Digital Research by saying the company could have made a fortune not from software sales but from copyrighting the A> prompt. Too late now.

But as time goes by the old A> prompt may go the way of the wind-up clock. We now realize that the graphical user interface is the obvious trend of the future. We can deny it until we're blue in the face, but reality says differently. This means the mouse as a pointing device will be sold as a standard feature on every computer.

I am a big fan of the command-line interface; I'll admit it. I like to punch in a bunch of commands to get results fast. Moving around the screen with a mouse is too often inconvenient. The worst part about a mouse is that you cannot "mouse ahead." With command-line processing you usually don't have to wait around for the cursor or prompt to return. You can type in command after command, each followed by a Return, and the machine will process them in order. With a mouse you have to wait for icons (or something to click on) before you can proceed.

Of course, the ever-increasing power of these machines can quickly correct this delay by throwing stuff at you faster than you can type or click. At least that's what the pundits always tell you. The problem, as we all know, is that as memory increases and processor speed improves, more-cumbersome programs invade the environment. Speed breeds laziness. So the machine will *always* run like a slug. I call this: "Slugs Constant." No matter how fast a computer is, inefficient programs will evolve so that the machine will appear to run at the same speed as always.

I figure that Slugs Constant is about 9,600 bits per second. Programs tend to run neither faster nor slower than 9,600 bps at the user interface level. This is an observation that I'm sure can be proven.

Anyway, we can assume that Slugs Constant will maintain the impossibility of faster clicking, or what I'll call "functional mouse ahead." This means that the user interface of the future will have to have command-line capability for the times when many commands have to be executed in a row. We have yet to see a decent implementation of this kind of hybrid (developers, take note).

This brings us to the obvious question: Why use a mouse at all? I ponder this many times. I think because it's fun and it psychologically puts you more "in tune" with the machine and gives you more control, too. I hate to say it, but it makes the machine friendly.

It's interesting how only the most-novice or the most-advanced users rely on a mouse. The typical PC business corporate drone doesn't need one and kind of prides himself on being a power user because he knows how to change directories. He'll be the last to come around.

The mouse is good for the beginner because a decent mouse interface is easy to learn and immediately fun. Advanced users like it because, on a complex machine, to feel comfortable you have to have ultimate control over the environment, and that means moving and sizing windows around on the screen. Only the mouse can do this easily. Executing programs and other utilitarian chores such as viewing a directory are done with the mouse only because it may be the easiest thing to do at the time. After sizing a window to get ready for a program, you may find it easy to leave your hand on the mouse and click on an icon. Nothing wrong with that.

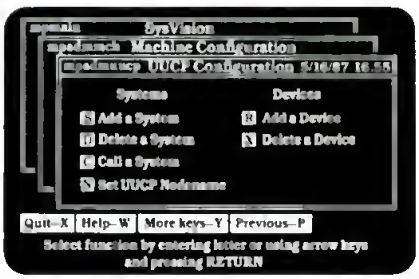
The IBM PC scene is not riddled with mice, that's for sure. Awkward interfaces such as *Microsoft Windows*, mediocre mouse drivers, and hostile systems not meant for mice do nothing to encourage a move toward mice. Nevertheless, you can be sure there is a mouse in your future. The micro user always follows the lead of the superhacks who now use mouse-based Sun workstations or LISP machines. The mouse will be like the car cigarette lighter. You'll have one whether you need it or not. Count on it.

Illustration: Jennifer Skopp

# Is Xenix history?

## Their Interface

## Our Interface




## Their Performance**

| | |
|---|---|
| AVERAGE USE | 141 seconds |
| DISK WRITES | 221 seconds |
| 32 BIT MATH | 351 seconds |

## Our Performance*

| | |
|---|---|
| AVERAGE USE | 81 seconds |
| DISK WRITES | 184 seconds |
| 32 BIT MATH | 193 seconds |

(Comparison of IBM's Xenix 2.0 vs System V/AT 1.3.6)

** Nelson Business Benchmark™, Neal Nelson & Assoc.

## System V Compatibility*:

| Their's | | Our's | |
|---|---|---|---|
| sdb | No | sdb | Yes |
| COFF | No | COFF | Yes |
| f77 | No | f77 | Yes |
| Sys V make | No | Sys V make | Yes |
| ctrace | No | ctrace | Yes |
| di troff | No | di troff | Yes |

*(And on. And on. And on. And on. And on.)*

## Their Price

## Our Price*

* Call us for the complete story

Since 1983 AT&T has been developing real UNIX® as the standard for Intel 80286- and 80386-based computers

Microsoft plans to adhere to the standard next year, but that standard is available *now* from MICROPORT! As it has been for years!!

Why buy a hard-to-use, poor-performing and overpriced "look-alike", when you can get the real thing. System V/AT ™ —from MICROPORT. System V/AT is based on standard UNIX. However, to the basic multi-user/multi-tasking operating system we've added a host of features like SysVision ™ to automate system administration, File System Hardening to protect your data, and HyperCache ™ to boost performance.

You also get one-stop-shopping for the most popular UNIX applications such as Informix, Unify, RM-COBOL, R-Office and many others. All this with 24-hour support.

Before *they* deliver the operating system, *we* will be shipping—among other exciting products—such offerings as windowing, graphics, SUN NFS, TCP/IP and DOSMERGE ™ (to run DOS applications under UNIX).

---

### Order System V/AT *NOW* and get the NUTSHELL™ guide

**"Learning the UNIX Operating System."**

**800/722-UNIX**
**800/822-UNIX (CA)**

### SYSTEM V/AT 90-DAY MONEY-BACK GUARANTEE

| | |
|---|---|
| System V/AT (two user) Runtime with Sys Vision | **$199.00** |
| Software Development System C, fortran and development tools | **$249.00** |
| Text Processing System (nroff, troff, di troff, etc.) | **$199.00** |
| Complete System (all three) | **$549.00** |
| Unlimited User License | **$249.00** |

***System V/386—call for availability and prices.***

UNIX is a trademark of AT&T. System V/AT, SysVision, HyperCache and DOSMERGE are trademarks of MICROPORT SYSTEMS, INC.
NUTSHELL is a trademark of O'Reilly & associates, inc. (DOSMERGE is a derivation of Locus Computing Corporation's MERGE 286)

CIRCLE 170 ON READER SERVICE CARD

MICROPORT

10 Victor Square, Scotts Valley, CA 95066

## "Microport V/AT is a *real* UNIX system."

■ JOHN C. DVORAK

# INSIDE TRACK

*Shocker at the CD-ROM Conference; DVI blows CD-I away. Phillips loses out; Microsoft cashes in.*

*Date: March 2–6. Place: Seattle. Event: CD-ROM Conference. Sponsor: Microsoft. Theme: Confusion, part II.*

It was the same as last year: confusion, head scratching, shoulder shrugging, handwringing, and itchy knees. It seems that the entire CD-ROM scene is turning into a soap opera. It's now obvious (after this year's affair) that **breakthrough technologies** that "make it a whole new ball game" will be released ad infinitum leaving people shaking their heads, raising their eyebrows, and coming back for more. Another episode of the **ROM and the Restless**, a suckers game. Microsoft threw an event called the **CD-ROM Conference.** It was mostly attended by business types who were told how a compact disk can somehow hold data. "Golly, folks, the format and all that stuff are standardized; we call it a CD-ROM."

During that first conference, **Phillips International made a surprise announcement** of a new technology called CD-I (compact disk interactive). It looked to be a CD-ROM killer. It added fancy new features to the old standard. Phillips developed CD-I secretly and without the help of Microsoft, leaving our hapless Washingtonians in the lurch. Gates was irked.

So this year, RCA Labs rolls out the results of a **secret 5-year project**—a chip set called DVI (digital video interactive). Excuuuuuse me, Phillips, but DVI just killed CD-I. The Phillips guys were steamed. It embarrassed other firms like French electronics giant Thompson CSF, which minutes before the RCA demonstration made an **ill-timed announcement** in support of the CD-I standard. **Everyone laughed up their** sleeves because the whole town was aware of the RCA stuff. I guess the Frenchmen were too busy checking the stock price of another fine Thompson investment—Fortune Systems.

**Facts:** The two-chip RCA video display processors can turn a plain-vanilla compact disk into a device that pumps out real-time full-color **action-packed video** with digital sound. Seventy-two minutes worth to be exact. Phillips hoped to get 7 or so minutes of real-time video from CD-I, someday soon. RCA has managed to squeeze a frame of video into a 5K-byte chunk (down from 500K). The hour or so of video is compressed by a mainframe, dropped onto a CD disk, and then decoded by the new chips. The compression schemes are proprietary. The quality is **as good as your VCR,** no kidding. It allows full-motion, full-frame video to meander across the 150K-byte-per-second data transfer rate of a CD player (5K per frame, *and* 30 frames a second). It is also interactive, so you can control complex programs in real time. **Mind boggling.** Astonishing. Shoulder shrugging time.

**Not discussed** at the conference is what exactly will RCA do about marketing the chips? The RCA guys didn't know. I was told there are a lot of options, but RCA doesn't know whether it will license the chips, make chips and sell them, or produce a product and keep the chips to itself.

Now that GE is running the show, **I expect the worst** in the way of decision making. GE semiseriously dabbles in consumer products, and it's one of those companies that moans and groans about consumers preferring prettier Japanese goods. "Big jet engines is where the action is," GE will tell you.

So **expect nothing** to come of the RCA chips and expect the confusion in the business to remain, thus allowing the clunky CD-ROM standard to gain the foothold it needs to survive. More moola for Microsoft.

You'll never get anyone to admit that the game is nothing more than jockeying for quick bucks. I ask about the DVI: "Is it a CD-I killer?" "I wouldn't want to be quoted saying that," said Gates smiling. "Is it a CD-I killer?" "I wouldn't want to be quoted saying that," said Arthur Kaiman, RCA Digital Products Lab Director, smiling and **obviously reading from the same script.**

Okay, I'll say it. It's a **CD-I killer.** More importantly and overlooked by all is the fact that apparently each year some new whiz-bang technology (that takes 1 to 3 years to implement) will be announced. **The result: nothing gets adopted.** Nothing, that is, except the old CD-ROM standard—especially now that real live products are available. All the confusion over the new stuff puts Microsoft in the driver's seat. Another worthwhile Gates quote: "We weren't in *cahoots* with RCA! But we knew about all this." Enough said.

**Aside Dept.:** If you need to get into the CD-ROM scene, I'd recommend a subscription to the **CD-ROM Applications Forum**. The first issue of this newsletterlike publication includes a rare organizational chart of Phillips that outlines who reports to whom . . . all a secret until now. This is a must publication for anyone interested in the business. It's $297 a year. Write: CD ROM Applications Forum, 2101 Grandin Rd., Cincinnati, OH 45208, or call (513) 871-7767.

**Best New Name for a Company Dept.:** A company at the CD-ROM Conference named LoDown packages scanners and systems so you can make a master for a CD-ROM. The company likes to brag about its **LoDown SCSI interface.** Honk, honk, honk. PC

# WHY PAY MORE?

**OUR EVERYDAY LOW PRICES**

Lotus 1-2-3 . . $305
DB III Plus . . . . $389
Word Perfect . . $195
PC Mouse w/DR Halo . . . . . $98
Okidata 182 Plug & Play . . . $245
NEC Multisync . . . $565

## YOUR MONEYSWORTH GUARANTEE

- ★ Credit cards not charged until after your order has been shipped
- ★ Orders shipped same day on all stocked products (on orders placed by 2pm EST)
- ★ All products guaranteed to be the latest versions available
- ★ Only factory sealed and fully warranteed products stocked
- ★ Never a surcharge for American Express, Visa or Mastercard

• No sales tax on orders shipped outside NY State • Please add 3% for insurance, shipping and handling ($3.00 minimum) (Some products may have a surcharge due to weight and size restrictions) • Defective merchandise can be returned for repair or exchange (please call for R.A. no.) • Due to variety of products, we cannot guarantee compatibility

### GRAPHICS/CAD-CAM

| | |
|---|---|
| Autocad 2.52 | $2,129 |
| Drafix | 185 |
| Freelance Plus | 315 |
| Harvard Presentation | 209 |
| Microsoft Chart | 169 |
| Prodesign II | 169 |

### LANGUAGES

| | |
|---|---|
| Microsoft C | $255 |
| Microsoft Cobol | 399 |
| Microsoft Fortran | 259 |
| Microsoft Macro Assembler | 89 |
| Microsoft Quick Basic | 69 |
| Turbo Pascal | 55 |

### PROJECT MANAGEMENT

| | |
|---|---|
| Harvard Total II | CALL |
| Super Project Plus | $275 |
| Time Line | 209 |

### FINANCIAL/ACCOUNTING

| | |
|---|---|
| BPI | $159 |
| Computer Associates | 321 |
| Dollars 'N' Sense | 94 |
| Great Plains | 386 |
| Managing Your Money | 105 |

### UTILITIES

| | |
|---|---|
| Carbon Copy | $113 |
| Crosstalk XVI | 87 |
| Fast Back | 85 |
| Fixed Disk Organizer | 45 |
| Microsoft Windows | 57 |
| Norton Commander | 29 |
| Norton Utilities | 45 |
| PC DOS 3.2 | 69 |
| Sidekick | 45 |
| Sideways | 35 |
| Smart Com II | 79 |
| Superkey | 37 |

### SPREADSHEET/ INTEGRATED

| | |
|---|---|
| Framework 2 | $389 |
| HAL | 97 |
| Lotus | 305 |
| Lotus Report Writer | 97 |
| Microsoft Multiplan | 110 |
| Smart Integrated | 419 |
| Supercalc IV | 269 |
| Symphony | 439 |

CIRCLE 525 ON READER SERVICE CARD

### DATABASE MGMT

Clipper ..... $329
dBase III Plus ..... 389
dBase III Plus Lan Pak ..... 553
Foxbase + ..... 229
Genifer ..... 195
PFS: Professional File ..... 129
Q & A ..... 221
R:Base System V ..... 329
Reflex ..... 81

### WORD PROCESSING

Display Write IV ..... $305
Microsoft Word 3 ..... 255
Multimate ..... 222
Multimate Advantage ..... 285
PFS Professional Write ..... 105
Word Perfect ..... 195
Wordstar 2000 Plus ..... 264
Wordstar Pro Pak ..... 219
XY Write III ..... 199

### LAPTOPS

NEC Multispeed ..... $1,549
Toshiba T1100 Plus ..... 1,729
Zenith Z181 ..... 1,749
*Now available:* luxurious leather carrying case for laptops only $149

### SURGE PROTECTORS

KENSINGTON MICROWAVE
Mastarpiece Plus ..... $109

### BACK UP POWER SUPPLIES

DATASHIELD
200 WT (PC) ..... $235
300 WT (XT) ..... 335
500 WT (AT) ..... 525
600 WT (AT) ..... 545

### MODEMS

HAYES
Smartmodem 1200 ..... $375
Smartmodem 1200B ..... 345
Smartmodem 2400 ..... 555
Smartmodem 2400B ..... 497

### GRAPHICS

HERCULES
Graphic Card Plus ..... $175
Color Card ..... 141
PARADISE
Auto Switch EGA ..... 339
Modular Graphics 3 ..... 169
QUADRAM
EGA Plus ..... 299
SIGMA
Color 400H ..... 439
TSENG
Eva 480 ..... 375
VIDEO 7
VEGA ..... 315
VEGA Deluxe ..... 375

### MULTI-FUNCTION BOARDS

AST
Six Pack + 384K ..... $195
Six Pack Premium ..... 259
Advantage 128K ..... 325
Rampage AT W/512K ..... 419
Rampage W/256 ..... 257
MONEYSWORTH (AST Comp.)
Money Memory ½ Card (384K) ..... 119
Money Memory ½ Card (576K) ..... 145
Money-Board AT Multifunction (128K) ..... 199
Money-Board Multifunction (384K) ..... 155
Money I/O Mini-Half Card ... 105

### MONITORS

AMDEK
12" 310A ..... $135
12" 300A ..... 119
Color 600 ..... 369
Color 722 ..... 461
NEC
Multi-Sync ..... 575
PRINCETON
Amber Msx-12 ..... 159
RGB HX-12 ..... 409
RGB HX-12E ..... 525

### PRINTERS

CANON
Laser LBP8A1 ..... $1,829
EPSON
FX286 ..... 529
FX85 ..... 365
LQ1000 ..... 709
HEWLETT-PACKARD
Laser Jet Plus ..... 2,889
NEC
P-8 ..... 439
P-7 ..... 629
OKIDATA
182 Plug & Play ..... 245
192 Plus ..... 345
193 Plus ..... 515
2410 ..... 1,741
TOSHIBA
351 P/S ..... 989
321 P/S ..... 459

### KEYBOARDS

KEYTRONIC
5151 Deluxe Keyboard ..... $159

### MOUSE INPUT DEVICES

MICROSOFT
Mouse (Serial) ..... $119
Mouse (Buss.) ..... 109
MOUSE SYSTEMS
PC Mouse ..... 99

### HARD DISKS

PLUS
Hard Card 20 Mb ..... $675

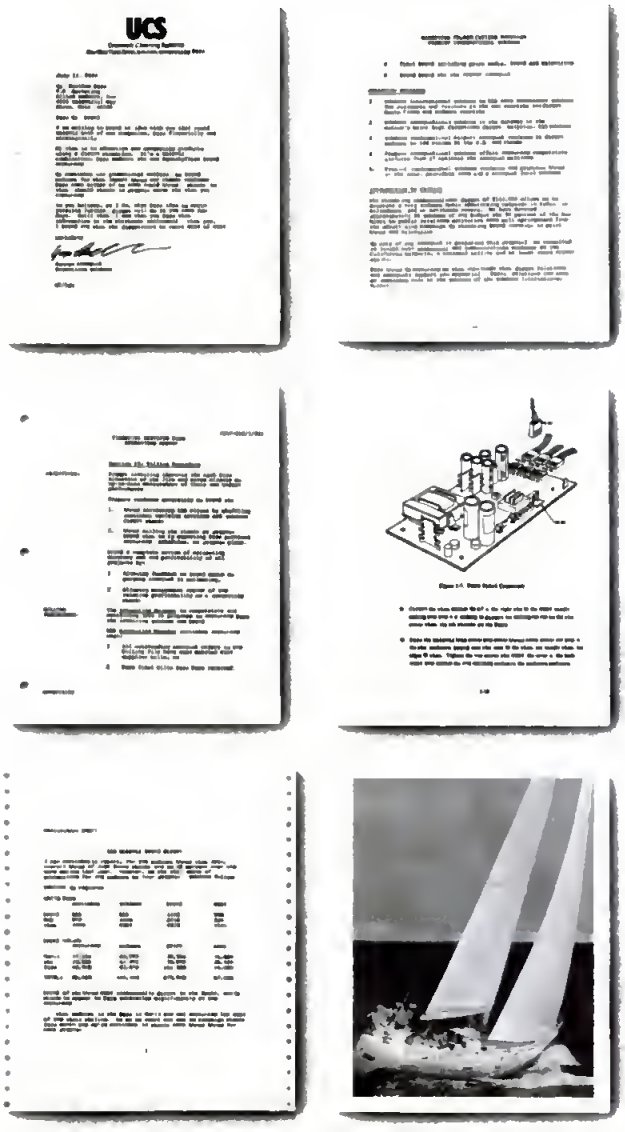
### BACK UP STORAGE DEVICES

EVEREX
Excel 60 Mb Int ..... $719
Excel 60 Mb Ext ..... 845
IOMEGA
Bernoulli (10 + 10) ..... 1,815
Bernoulli (20 + 20) ..... 2,349
Bernoulli 10 MG Cartridge Tri-Pak ..... 135
Bernoulli 20 MG Cartridge Tri-Pak ..... 185
SYSGEN
Image Tape Backup 20 Mb Ext ..... 699
Image Tape Backup 20 Mb Int ..... 539

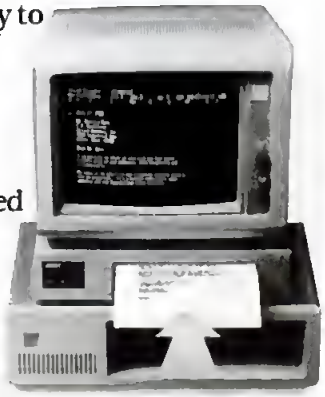
All prices and policies subject to change without notice

1005

# SIX REASONS TO TEACH YOUR PC TO READ.



If these look anything like the papers piling up in your office, you need PC Scan Plus,™ the new intelligent scanner from DEST.



It's the fastest way to get information off your desk and into your PC, where you can use it.

You see, PC Scan Plus can read a typed page into your PC's word processing program, completely formatted, in less than a minute.

PC Scan Plus works with MultiMate,™ WordStar,® Word Perfect™ and the others. It can read most office typestyles, including dot matrix, with accuracy no other scanner can touch.

What's more, if you're a desktop publisher, PC Scan Plus can do even more.

Besides words, you can scan photographs, line art, logos and other images into all the top desktop publishing software. Ventura,™ PageMaker,™ and the rest.

And if all this isn't reason enough to take a closer look at PC Scan Plus, just give your in-box a quick scan.

Then call us for a free brochure or a demo.

*There's no smarter, faster input device than PC Scan Plus. It can read words, illustrations or photographs into your PC's word processing or desktop publishing programs in seconds. At the touch of a key. And it can do the same for an Apple® Macintosh.™*

DEST

800-538-7582

In California, 408-946-7100.

© 1987, DEST Corp. PC Scan Plus is a trademark of DEST Corp., not to be confused with PC Scanner, a product of Caere Corp.
Other names indicated by ™ or ® are trademarks of their respective manufacturers.

CIRCLE 285 ON READER SERVICE CARD

# A Business That Depends On A Reliable Information Network Should Let Its Computers Do The Talking.

Computers have better memories than people. So with networking, everyone gets the story straight.

At Sears Business Systems Center, we analyze your situation to find out exactly what you need. Whether it's connecting existing equipment. Or planning to network an entire office.

Networking means less busy work for your employees. Since they can share files, data need only be entered once. After installing a network, expansion is less expensive. Because hardware can also be shared.

If you'd like to know more, contact Sears Business Systems Center. For one near you, call 1-800-533-2535, Ext. 726. In Illinois, call 1-800-428-2426, Ext. 726.

When it comes to business solutions, it's important to consult a reliable source.

SEARS DISCOVER TODAY'S WAY TO SAY CHARGE IT!

**SEARS Business Systems Center**

CIRCLE 124 ON READER SERVICE CARD

# Introducing the Hercules InColor Card.

*It runs more software at a higher resolution than any other color graphics card.*

The Hercules® InColor™ Card offers everything you'd expect from a high resolution color graphics card from Hercules — and more.

*Compatibility:* The InColor Card is compatible with the thousands of programs that run on our monochrome cards.

*Color:* The InColor Card gives color capability to Hercules-compatible software like 1-2-3® and AutoCAD®.

*Resolution:* The InColor Card's resolution of 720x348 is the highest of any widely supported standard.

*RamFont:* The InColor Card has our unique RamFont mode — in color.

**Better graphics.**

Hercules is known for bringing high resolution monochrome text and graphics to programs like 1-2-3® and AutoCAD®.

Now the InColor Card gives you the same high resolution 720x348 graphics in up to 16 colors using an IBM® Enhanced Color Display, multisync monitor, or equivalent.

That's the highest resolution of any widely supported graphics standard.

And no other color graphics card allows you to move back and forth between color and monochrome systems *without changing drivers.*

*The InColor Card's RamFont mode gives Lotus 1-2-3 a pop-up graphics window and lets you view nearly twice as much spreadsheet data—all in full color.*

**Runs more software.**

All Hercules-compatible text, graphics and RamFont software runs on the InColor Card in black and white, or at least two colors.

And many popular programs like 1-2-3, Symphony,® AutoCAD and Microsoft® Windows that use graphics or RamFont, run in full color.

**More powerful RamFont.**

RamFont is a new mode developed by Hercules that gives your software the ability to display multiple fonts at lightning fast speeds.

RamFont transforms advanced word processors like Microsoft Word from slow to text-mode fast.

Technical word processors like Lotus Manuscript™ use RamFont

to display onscreen the text you want to print.

Even 1-2-3 uses RamFont to almost double the size of the spreadsheet picture.

And now, with the InColor Card, you get an enhanced RamFont with 3,072 programmable characters in up to 16 colors.

All the way up to 12,288 characters in four colors.

With the InColor Card's RamFont, no program should run out of speed, color or fonts ever again.

*AutoCAD gets the same high resolution 720x348 graphics as our famous monochrome cards—only now in full color on an IBM Enhanced Color Display.*

### What the InColor Card could mean to your company.

The InColor Card allows you to run a program in color, and then move to a Hercules Graphics Card Plus and run the same program in monochrome.

Without changing drivers.

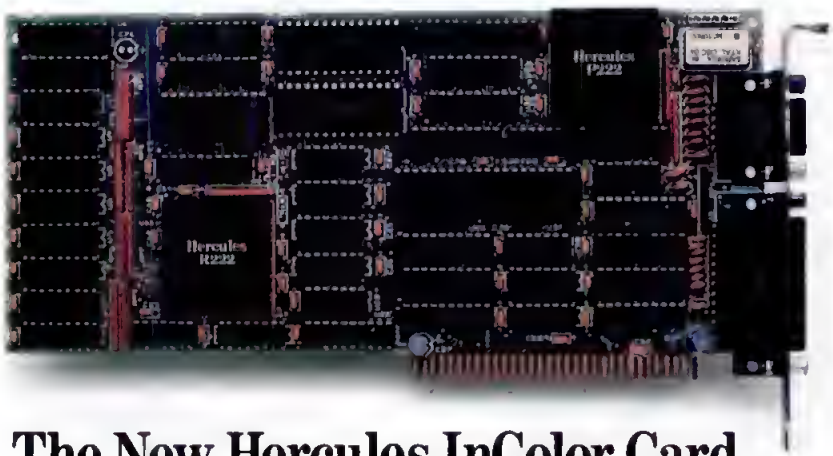
Compatibility between the InColor Card and our monochrome card allows you to network around one standard — Hercules. At last your PCs will have compatible graphics, in color or monochrome.

Remember, only the InColor Card has color-to-monochrome compatibility, high resolution text and graphics, and the power of color RamFont.

Call 1-800-532-0600, or 1-800-323-0601 in Canada, Ext. 504 to find out more on how the Hercules InColor Card can improve your software.

### Features of the Hercules InColor Card

- Hi-res text with 9x14 character size in up to 16 colors with attributes
- 720x348 Hercules graphics in 16 colors selected from 64 color palette
- Special RamFont mode displays 3,072 programmable characters in 16 colors with attributes, up to 12,288 characters in 4 colors
- Runs Hercules-compatible graphics software in b&w or any two background colors
- Designed for use with the IBM Enhanced Color Display, multisync monitors, or equivalents
- Software diskette includes font editor, sample fonts, and Hercules utilities
- Parallel printer port
- Two year warranty




# The New Hercules InColor Card.

Hercules Computer Technology, 2550 Ninth St., Berkeley, CA 94710 Ph: 415 540-6000 Telex: 754063 Fax: 415 540-6621 Trademarks/Owner: Hercules, InColor, RamFont/Hercules; Lotus, 1-2-3, Symphony, Manuscript/Lotus; Microsoft/Microsoft; AutoCAD/AutoDesk; IBM/IBM

CIRCLE 142 ON READER SERVICE CARD

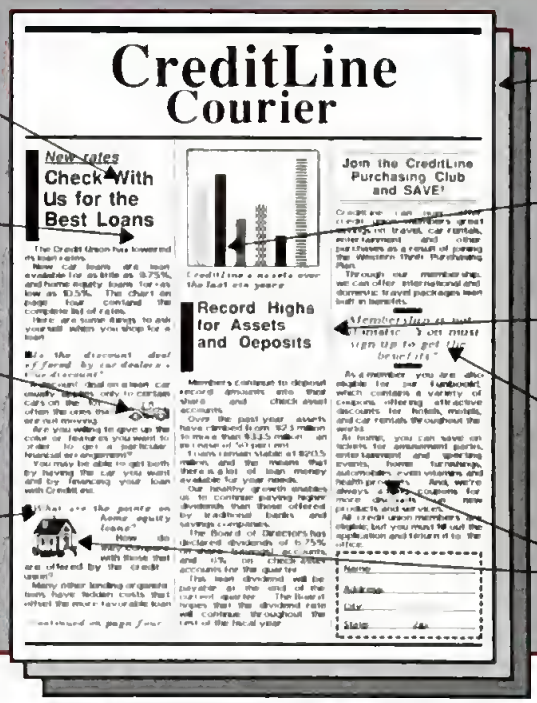
# Outstanding Desk Top Publishing For Under $100

Over 30 fonts in a variety of sizes and styles.

1 to 10 columns per page.

Over 250 pieces of artwork.

Automatic text flow around graphics—to the left side, right side, both sides, neither side and across.




Multiple pages in a single document.

30 patterns for boxes, fill and lines.

Vertical, horizontal and box lines of any width.

Fonts with bold and italic typefaces.

Fully integrated text and artwork.

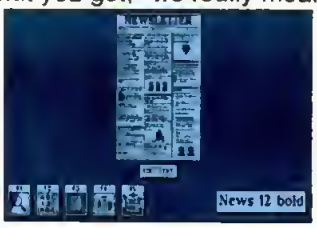
## A surprisingly powerful package.

When you want to produce professional looking newsletters, flyers and ads, without a lot of cost or complication—all you really need is your PC, a dot matrix printer and NewsMaster.

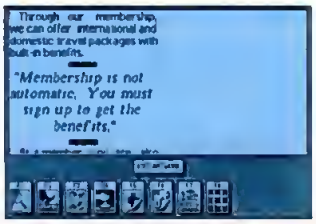
For under $100, NewsMaster gives you over 250 highly detailed graphics, 30 different type fonts, lines and boxes of any width. Plus versatile text processing capabilities, flexible layout options and automatic text flow.

## *True* WYSIWYG

When we say "what-you-see-is-what-you-get," we really mean it.



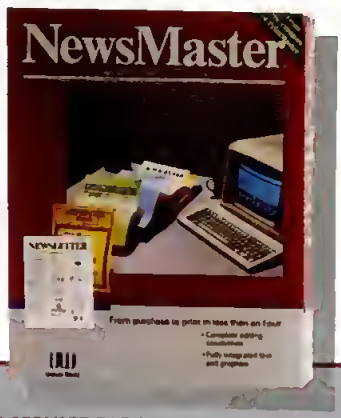

NewsMaster shows you both art and text, *exactly* the way it will appear on the printed piece, while you're working.




And, you can choose from four different page views and 8 levels of zoom. With full editing capabilities in any mode.

## Easy to learn, simple to use.

NewsMaster is so easy to use, you'll be mixing text, lines, boxes and clip art into multicolumn, multi-page documents in less than an hour!




## Professional results.

Of course, the real proof is in the final printed product. That's where you'll really come to love NewsMaster. Incredibly imaginative, high density graphics and text. And all from your dot matrix printer.

Visit your local computer dealer and get your copy of NewsMaster today. Or call Unison World at (415) 848-6666.

NEWSMASTER IS AVAILABLE FOR MS-DOS COMPATIBLE COMPUTERS.

**Unison World**

2150 Shattuck Avenue,
Suite 902
Berkeley, California 94704
(415) 848-6666

Unison World is a division of Kyocera Unison, Inc.

NewsMaster is a registered trademark of Kyocera Unison, Inc.

CIRCLE 233 ON READER SERVICE CARD

■ JIM SEYMOUR

# AN END TO DOC-BASHING

*It's easy to pick on software documentation—it comes from a long tradition of awfulness. At least a few software vendors have learned how to do the job.*

One of the things they teach you at Famous Computer Columnists School is that there are several topics always good for another column, no matter their age and weariness.

A Quick Trip to the Metaphorical Mailbag is the all-time classic, of course. But if your letter-writing-and-answering skills suffer from a lack of *Pentboy* or *Playhouse* experience, or you suffer a sudden case of ethics, there are others.

Copy protection, for example (*boo, hiss*). Overloaded telephone-support lines (*rant, rave*). And lousy documentation (*what else is new?*).

Copy protection is fading fast, and the policy of charging for telephone support is ending those half-hour Muzak concerts while you're on hold.

But documentation-bashing seems likely to remain popular, rich if moldy grist for columnar mills.

The predictability of doc-bashing columns usually chases me away from playing the game. But I'm going to take a deep breath and tackle the problems of software documentation once more. Because while no one was looking, some very *good* documentation has appeared.

**WHAT GOOD DOCS NEED** I've long argued that good software documentation has at least four characteristics.

- The material is broken out into several bite-sized chunks, rather than stuffed into one huge, clumsy, slipcased ring binder.
- The documentation offers several entry points, with different materials for those (*a*) new to computers, (*b*) new to this kind of program, (*c*) familiar with programs of this sort but new to this program, and (*d*) familiar with this program but upgrading to a new release.
- The documentation reflects the fundamental differences between *learning* the program (training materials) and *using* the program once you know the basics (reference materials).
- Housekeeping details such as installation instructions don't clutter up the main manuals but are tucked away in a separate folder.

Ideally, good documentation also includes use of the computer itself to help users learn the program. I don't include this in those four points, because it's possible to do a good job of teaching and documenting a program without disk-based tutorials. But failing to include training routines on disk forfeits a great deal of free instructional moxie.

(*Microsoft Word*'s disk-based system, Learning Word, is an example. Users can learn *Word* entirely from the tutorial. Even better, Learning Word grafts onto the program itself, so the *Word* user trying something for the first time can go out to the tutorial *from within Word* and get a quick lesson—not just a couple of help screens—on how to play that tune.)

Illustration: Jennifer Scopp

**BASH-PROOF** Several mainstream programs have, in their most recent releases, incorporated some or all of these approaches in their documentation.

From its first shipments a year and a half ago, *Paradox* has offered what may be the best computer documentation ever written. Open the box and you find five printed pieces: the Introduction, an unintimidating installation, overview, and training booklet; a fat, well-organized User's Guide; a similarly fat and well-organized PAL User's Guide; and two thin booklets, Quick Guides to *Paradox* for *1-2-3* and *dBASE* users.

The documentation, produced by John Unger Zussman and Suzanne Rodriquez, is a paradigm of clarity, organization, and good graphic design. The stuff's even *literate*, for God's sake: How many computer manuals have quotes from Gilbert and Sullivan?

By breaking the material out into logical parts, by providing special "welcome aboard" guides for *1-2-3* and *dBASE* users (90 percent of *Paradox* customers?), and by getting the tougher-going PAL applications-language material out of the way of the great majority of *Paradox* users who'll never use it, Ansa Software reinforces the

■ JIM SEYMOUR

idea of the program: powerful but, paradoxically, easy to use.

The PAL material just isn't up to the rest of the documentation—it feels as if it was produced by a different group—but since only a small subset of *Paradox* users will ever dip into it, and even then only after they've learned the program well, that can be tolerated.

VM Personal Computing's *Relay Gold* documentation includes only two manuals, Getting Started and a Reference Guide, but both demonstrate how well the manufacturer understands PC users' needs. Getting Started is the usual installation and primer, with a twist: a hundred pages of step-by-step "How do I . . . " recipe-book-style instructions for specific tasks.

VM understands that people buy modems and comm software to send things from here to there, not to become telecommunications theorists.

*XyWrite*'s documentation used to be, to put it gently, awful. But with the release of *XyWrite III* last year, XyQuest showed it had also made the expensive commitment to good documentation. The old-style slipcase binder with tabbed sections is still there, for those steeped in tradition. But there's also an installation folder, a very good Quick Start booklet, and good if oddly named Basic Tutorial and Applications Tutorial training manuals.

The temptation here is to say a program as difficult to learn as *XyWrite* needs all the help it can get. But that would be a cheap shot, and wrong, as the new documentation proves: *XyWrite*'s fierce reputation arose not because the program itself is so intrinsically difficult, but because the old documents were so bad.

It's difficult to try to trace the evolution of trends in the PC world, but to give credit where I think it's due, the first good documentation I can recall was shipped with the first version of *1-2-3*. It was direct, tolerably well organized, and sometimes even funny.

Lotus also gets credit for the move away from the fat-ring-binder school with its first *Symphony* documentation and, especially, the *1-2-3*, Release 2, documents, which codified the several-booklets approach for many. Lotus recognizes that for many PC users, *1-2-3* will be the first program they install after DOS; the company provides intelligent hand-holding without insults and pandering.

I have a lifetime supply of half-size three-ring binders in slipcases, almost all of them filled with badly organized, unreadable, often simply wrong instructions for using software. A few vendors have begun showing us that it doesn't have to be that way. PC


IT TAKES FEWER DOLLARS AND MORE SENSE TO BUY AN AT-COMPATIBLE THESE DAYS.

Confused by all the AT ads you see?
You've got to read pretty closely to see just what you are or are not buying.

MORE MEMORY. MORE SPEED. MORE OPTIONS.

Most lower-priced ATs have only 256K RAM memory, some come with 512K, our Noble 286 comes complete with 640K.
A lot of ATs come with only one speed. The Noble 286 goes from 6MHz to 10MHz with a simple keyboard command.
Most come with under 200 watts of power, ours has 220 watts. And be careful, some of the competition doesn't rely on Intel reliable microprocessors, we do.

THE LOWEST PRICE.

Check all the other ads, read the small print and then look at the price. You won't find a lower cost AT on the market.
Even after adding our TTL monitor, we're still under the market average.
How can we beat their price?
We only sell direct, no middle men, dealer reps or added transportation costs. All that savings gets passed on to you.

RELIABILITY.

We don't sell "cheap" computers.
Our Noble 286 goes through the same burn-in period, offers the same warranty and money-back guarantee.
Maybe that's why we're grabbing the attention of leading publications in the PC world.

NOBLE 286
STANDARD FEATURES
640K RAM
1.2MB half-height Floppy Drive
Intel 80286, Dual Speed 6 and 10MHz Microprocessor
220 Watt Power Supply
101-Key AT Style Keyboard
8 slot Motherboard with 80287 MATH Coprocessor socket
1 Year warranty includes parts, labor and freight
Toll free engineering and technical assistance
Made in the U.S.A.
For fast delivery use your VISA or MasterCard
Complete system price $999
Options: Monitors priced from $165 to $599
Hard Disk Drive $449

PC DI$¢OUNT
More computer for a lot less money
1-800-843-7042, in Texas call 713-655-9047

IBM PC, IBM XT and IBM AT are trademarks of IBM Corporation. Intel is a registered trademark of Intel Corporation. ©1987 PC Discount

CIRCLE 325 ON READER SERVICE CARD

# AW . . .
# WHAT THE HECK!

## ProDesign II — Still $299!

ProDesign II — the Easy-to-Use CAD System. The CAD system that was introduced two years ago for the amazingly low price of $299. The CAD system that has undergone four major revisions with more than 400 enhancements. The CAD system that still costs only $299!

How do we do it? Our accountants said to raise the price to cover research and development costs. Our business advisors said to charge more for the additional features. Our competitors said it's impossible to stay in business selling a comprehensive CAD package such as ProDesign II for only $299.

And our customers said $299 is great. So, we said:

"Aw . . . What the Heck! $299 it is!"

Now, two years after its introduction, ProDesign II is one of the world's leading CAD packages. It has features previously found only on CAD systems costing thousands of dollars. For the single price of $299, you get these features and more:

- Support for more than 180 printers (including color printers)
- Support for more than 80 plotters, with plotter optimization.
- Easy-to-Use single keystroke commands.
- On-screen menus accessible with a mouse.
- Comprehensive drawing commands, including the finest curve fitting in the industry.
- Editing features unsurpassed by ANY other CAD package.
- Extensive snap features, including snap to point, endpoint, midpoint, line, circle, ellipse, arc, intersection, and perpendicular.
- True Auto Dimensioning with several formats.
- Extensive Layering features.
- Full Macro capabilities.
- Specialized drawing aids, such as tangents to circles and ellipses, parallel lines, parallel curves, wide lines, and more.
- Complete hatching with up to 40 different patterns.
- Area and length calculation for line curves, circles, etc.
- Full Zoom, Pan, and Rotate capabilities.
- Capability to transfer drawings to and from other programs.
- Capability to Break/Trim Lines, Curves, Circles, Arcs, and Ellipses.
- Many more features — *All for only $299!*

Where do you get ProDesign II? See your local computer dealer, or contact:

**American Small Business Computers, Inc.**
**118 South Mill Street**
**Pryor, OK 74361**
**(918) 825-4844**
**Telex 9102400302**

*Want more information? Call or write for a detailed brochure and a free demo disk!*

## PRODESIGN II STILL ONLY $299!

CIRCLE 475 ON READER SERVICE CARD

# GREAT IBM PC SOFTWARE UNDER $10!

## SOLID SOFTWARE VALUES, PRICED FROM JUST 75¢ TO $7.95...ALL NO-RISK GUARANTEED FROM SOFTWARE EXPRESS/DIRECT

**JOIN THOUSANDS OF SATISFIED IBM (AND COMPATIBLE) PC OWNERS** who've already gotten more value for their software dollar with powerful Software Express/Direct products.

**THE SOFTWARE CHANNEL** Incredible software values carefully selected, evaluated and documented by our editorial staff...all programs shipped on high-quality diskettes for instant use. Minimum order is $10 if these are the only programs you buy from us—order as many more as you like. However, if you order at least one other POPULAR SOFTWARE package, you may also order less than this $10.00 minimum.

☐**PROJECT MANAGER** Superb value in a project management package! An excellent and complete GANTT and PERT project manager for the PC. Also features full charting capabilities. (E2270691)**$3.50**

☐**INVENTORY CONTROL** Good inventory control program for the small business. (B2270781)**$2.50**

☐**DATA MANAGER** Create infinite custom databases for your own applications. An excellent, full-featured database program at a super price. (B2270791)**$3.50**

☐**BUSINESS MATH** 36 useful business math and statistics functions. (B2270981)**$1.50**

☐**TEMPLATE MAKER** Design cut-out command cards for your favorite programs (EPSON/IBM dot-matrix printer req'd). (B2270951)**$1.50**

☐**CALENDAR GENERATOR** Generate calendars for any month and year. (B2270961)**$1.50**

☐**COMPUTER TUTOR** Excellent, complete tutorial covers all aspects of PC use for the novice...colorful and interactive! (E2280971)**$3.50**

☐**SPELL/TYPE TEACHER** Excellent for young computerists...teaches a young child how to spell and type at the keyboard (Color/Graphics req'd.). (B2280451)**$1.50**

☐**TOUCH TYPER** Improve your typing skills with this series of keyboard drills. (E2280791)**$3.50**

☐**NEW DIRECTORY** A great replacement for the DOS DIR command with many more useful features, including file sort, file attributes, many display options and much more. (E3200182)**$3.50**

☐**SCREEN SAVER** Memory-resident utility to prevent screen burn-out—automatic timed screen turn-off (not Hercules or PCjr compatible). (E2200341)**$1.50**

☐**CIVIL WAR GENERAL** Recreate the major battles of the Civil War—see if you can beat History. (B2281751)**75¢**

☐**FAST DRIVE** Memory-resident program...cures disk honk and increases your disk drive's speed by almost 35%. (Not for PCjr) (E3200451)**$1.50**

☐**DRIVE TESTER** Suspect a drive problem? Full diagnostics for your floppy drives. (E2200461)**$2.50**

☐**MEMORY MAP** Displays amount of memory allocated for each memory-resident program. (Not for PCjr) (E3200541)**75¢**

☐**EPSON DRIVER** Maximize EPSON power with two programs. Set different IBM/EPSON printer fonts from DOS...also memory resident screen utility to print entire IBM character set. (E2220171)**$2.50**

☐**LETTER QUALITY PRINT** At last, professional-looking business letters! Turn your EPSON/IBM dot matrix printer into a near letter-quality printer. (E3220291)**$3.50**

☐**SUPER SPOOL** Save printing time...allows you to print documents while running other programs. (E3220461)**$2.50**

☐**PRINT FONT SETTER** A program to custom configure different fonts on any dot-matrix printer. (E2220951)**$2.50**

☐**DIGI-DRAW** Create computer art with your PC! Excellent basic graphics creation program using cursor keys (Color/Graphics req'd.). (B2252191)**$3.50**

☐**MUSIC SCORING** Compose and play music scores on your PC (Color/Graphics req'd.). (B2251811)**$1.50**

☐**PC PIANO PLUS** Electronic keyboard to play your own music. (E2250651)**$2.50**

☐**HOME FINANCE** Excellent, versatile home financial analysis program...analyze common household expenditures. (B2260191)**$3.50**

☐**1-2-3 FLOW CHARTER** Draw flow charts using Lotus 1-2-3 (req'd.) (A2270111)**75¢**

☐**IRA CALCULATOR** Handy retirement planning program calculates your IRA...how much to deposit...net worth at future time...etc. (B2260171)**$1.50**

☐**HOME INVENTORY** Catalog your household belongings...good for home insurance purposes. (B2260251)**$2.50**

☐**BIORHYTHMS** Interesting personal biorhythm calculator. (B2260911)**75¢**

☐**HOME GENEALOGY** A complete, excellent genealogy package to document family ancestry. (B2260972)**$2.50**

☐**RANDOM LOTTERY** Use the PC to generate random lottery numbers. (B2260912)**75¢**

☐**NAME THAT STATE** Name states/capitals...uses graphic U.S.A. map...popular and educational (Color/Graphics req'd.). (B2281781)**$2.50**

☐**ASTRONOMER** The complete astronomical information package...data for all planets and graphic displays for a given date (Color/Graphics req'd.). (E2282981)**$3.50**

☐**SUB ATTACK** Submarine tries to sink moving ships from your keyboard. (B2290111)**75¢**

☐**PC PINBALL** Finally, pinball for the PC! Plays just like the old mechanical games but without all of the quarters and the wasted space. Smooth flipper and ball action (Color/Graphics req'd.). (E3290191)**$3.50**

☐**FROG** Similar to the arcade favorite FROGGER. (E2291171)**$2.50**

☐**ASTEROIDS** Dodge and blast those crazy space rocks! Great version of the classic "Asteroids." Not AT or PCjr compatible (Color/Graphics req'd.). (E3295191)**$3.50**

☐**MISSILE ATTACK** The fate of our Nation is in your hands! Defend major cities against a surprise missile attack (Color/Graphics req'd.). (E3291191)**$3.50**

☐**THE RED BARON** Fight a WWI dogfight with the notorious Red Baron while defending your home base. Not PCjr compatible (Color/Graphics req'd.). (E3290181)**$3.50**

☐**PRO-AM GOLF** A good golf game for the armchair golfer. (E2290271)**$2.50**

☐**PC ASTROLOGER** An excellent, interesting Astrology program. Produces Star Charts and personalized Astrological report for your birthdate. (E2290591)**$3.50**

☐**NUCLEAR WAR** A simulation of a global thermonuclear war with the Russians (Color/Graphics req'd.). (B2291251)**$1.50**

☐**PC MONOPOLY** A well-done computerized version of the Monopoly board game. Color/Graphics suggested. (E3290381)**$2.50**

☐**CASTLE CARNIVORE** An excellent adventure fantasy game. (E2290781)**$2.50**

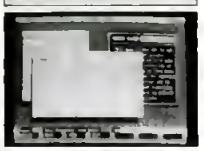
**POPULAR SOFTWARE**—Our best-selling programs, just $7.95 each—exclusively designed and fully guaranteed by Software Express/Direct.

***SPECIAL OFFER: Buy any two selections for $11.95, any three for just $14.95, or four or more for just $4.98 each and get even more value for your money!***

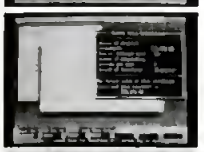
☐**LOANPAK Everyone's Loan Analysis Program** Fast window design does all standard loan calculations, including missing factor option to calculate monthly payments at various interest rates. Fast and easy printing of all tables.

☐**1-2-3 PRINTER Sideways Printing of Spreadsheet Models** Stop cutting and taping your spreadsheet models. 1-2-3 Printer easily prints models of all spreadsheet programs sideways on your EPSON or IBM dot-matrix printer.

☐**DESK LETTERS 50 Ready-to-Use Business Letters** Professionally-written business letters, suitable for many common business situations, ready to use and customize with any word processing program.



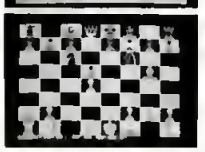
☐**BANNER MAKER Huge Printed Banners from Your PC** Great program for special events—prints continuous banner messages in seven-inch high letters on your PC printer. Includes typestyles for EPSON/IBM dot-matrix printers.



☐**INVESTICALC Eight Basic Financial Tools** Includes the most commonly-used investment calculations. Fast window design includes Future Value, Investment and Annuity Returns, Regular Deposits and lots more, including fast printing.

☐**DESK FILER Organize Your Disks With Neat, Printed Labels** Great get-organized program prints the filename contents of your disks in reduced-size type on commonly available self-stick disk labels, on your dot-matrix printer.

☐**TUT BUSTERS Fast-Paced Pyramid Action** Help Bold Adventurer Buster Cheops reach the jewel-encrusted urn at the top of Tut's Pyramid. Fun, fast, and very sneaky! (Color/Graphics req'd.)



☐**MONACO CHESS A Good, Cheap Chess** Great beginner's Chess. Eight skill levels and hours of fun...nothing like it at three times the price (Color/Graphics req'd.).

**OUR GUARANTEE:** Your complete satisfaction with all of our software products is our most important goal. If for any reason you are not satisfied with any program you purchase from Software Express/Direct, simply return it to us, along with the original packaging, within 30 days of purchase, and your purchase price and shipping costs will be promptly refunded.

### SPECIAL COLLECTIONS

**ORDER SPECIAL, GUARANTEED SOFTWARE CHANNEL COLLECTIONS AND SAVE UP TO 40% OFF THE PRICE OF REGULAR PROGRAMS ORDERED SEPARATELY:**

**THE BUSINESS COLLECTION $48.95**

☐35 value-packed Software Channel programs for Business and Personal productivity - it's our entire collection of Business programs in the Software Channel, and it's just $48.95 - you save $12.55 or 20% off regular prices. (E1272091).

**THE GAME COLLECTION $45.95**

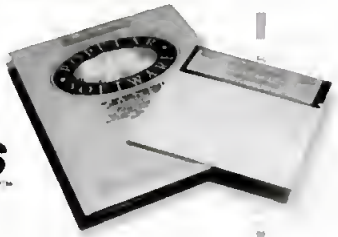
☐Save **40% OFF** the price of all Software Channel Game titles in this play-packed Collection. Includes all 54 arcade, adventure, and strategy games - you save $45.30. (E1292092)

**TO ORDER NOW, CALL TOLL-FREE:**

# 1-800-331-8192

VISA or MASTERCARD accepted...In MI, call (313) 822-0603

SoftwareExpress DIRECT™
America's Instant Software Company.



NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____ PHONE _____

I use en: ☐IBM PC ☐PC XT ☐PC AT ☐PCjr ☐Compaq ☐Other (Specify): _____

**ORDER TOTAL:** $_____(Orders under $15.00, please add $1.50 shipping and handling).

**METHOD OF PAYMENT:** ☐Check enclosed ☐VISA ☐MASTERCARD Enter credit card number below:

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | |

✔ Signature _____

EXP. DATE _____

**HOW TO ORDER: Phone Orders:** Call our Toll-Free number for fast shipment—VISA or MASTERCARD accepted. **Mail Orders:** Check the boxes next to the desired program titles, fill out address form at right, enclose check and mail to **Software Express/Direct, Box 2288, Merrifield, VA 22116**

PC-5/12/87

CIRCLE 471 ON READER SERVICE CARD

# When you're ready to get serious about surge suppression.

Here's important advice for PC users. With test after test proving that 70-90% of all PC malfunctions can be traced to disturbances in the power supply, a surge suppressor is the first accessory you should buy for your PC.

But don't put your trust in just any surge suppressor. Get one that gives your whole system superior protection. One that's engineered to the highest specifications.

Get a Kensington Master Piece or Master Piece Plus. Computer dealers will tell you they're the most popular PC surge suppressors. And the most serious. Because at Kensington, we're dedicated to giving your PC the best possible protection.

That's why Master Piece contains a unique two-stage surge suppression circuit incorporating a high-speed silicon semiconductor for the quick reaction necessary and a heavy-duty metal oxide varistor for the brute force required to keep even the largest surges from penetrating into your system.

| | Master Piece and Master Piece Plus |
|---|---|
| Meets IEEE 587-1980 Category A | ✓ |
| Meets IEEE 587-1980 Category B | ✓ |
| UL Listed | ✓ |

*The right surge suppressor passes all the tests.*

And that's why Master Piece Plus is the communications user's dream-come-true. Its additional circuitry smoothes surges, spikes and noise on the telephone line, protecting your modem and increasing the reliability of your data communications.

The circuitry in both Master Piece and Master Piece Plus is designed to exceed Category A of IEEE* specification 587-1980, as well as those established by UL†.

Sound good? Keep reading, it gets even better. Our circuitry also exceeds Category B of IEEE specification 587-1980. Under this category, created to guard against the severe spikes near the main power distribution panel of a building, Master Piece will even protect your PC from a simulated 6,000 volt lightning strike with a 3,000 amp follow-on current.

Now, this may look to you like we're taking more than the necessary precautions. And actually, we are. But after all, isn't that what you expect from the best?

Master Piece ($149.95) and Master Piece Plus ($179.95). For the dealer nearest you, or to speak to a Kensington sales representative, call (800) 535-4242.
In NY (212) 475-5200.

KENSINGTON.

**CIRCLE 272 ON READER SERVICE CARD**

*The Institute of Electrical and Electronics Engineers †Underwriters Laboratory Master Piece and Master Piece Plus are UL Listed © 1986 Kensington Microware Ltd

# A lot of computer for your money

## *Bentley-286*

**The Bentley-286/10** Personal computer features an Intel 80286 processor running at a blazing 10MHz, a Phoenix BIOS for insured compatibility, 512KB RAM expandable to 1024KB, keyboard, dual diskette drive/hard disk controller, and a 1.2MB diskette drive.

**Base system $1036**

**The Bentley-286/8** Has the same standard features as the Bentley-286/10, with 8 MHz, 0 wait state processing power.

**Base system $995**

**Bentley-286/10 42MB hard disk model**
A winning combination: the Bentley-286/10 plus a 42MB MiniScribe hard disk drive. The MiniScribe drive features a 28ms average access time and automatic head parking on power down. Partitioning software is included so you can take full advantage of the increased storage capacity.

**$1599**

**Bentley-286/10 20MB hard disk model**
A new addition to the Bentley family of computers: the Bentley-286/10 plus a 20MB, 65ms-access-time hard disk drive.

**$1379**

## Bentley Computers... The Price Performance Leaders!

**Monographics Card-** High resolution, monochrome graphics card with parallel port. Use with a monochrome monitor for high-quality monographics display.

*Only* . . . . . $99

**ColorCard-** High-resolution color graphics card works in color or composite mode. Use with a color graphics monitor.

*Only* . . . . . $79

**MonoCard-** Monochrome video display card with parallel port. Use with a monochrome monitor.

*Only* . . . . . $79

**EGA Color Monitor-** EGA high-resolution color graphics monitor with a fourteen-inch screen. Great for text, color graphics and games. Use with the ColorCard or the EGA card.

*Only* . . . . . $439

**Modems-** All Bentley modems are compatible with all popular communication standards and have auto answer, auto redial, and auto voice/data switching. External modems include LED status indicators and require modem cable for hookup.

300/1200 Baud Internal Modem . . . $99

300/1200/2400 Baud Internal Modem . . $239

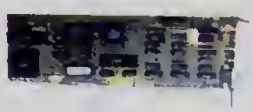
300/1200 Baud External Modem. . $139

**Monochrome Monitor-** Flat screen Samsung monitor with tilt and swivel base and twelve-inch screen. Use with the monographics card or monochrome card for easy-to-read display.

*Only* . . . . . $109

**NEC MultiSync-** The elite monitor. Adjusts to any horizontal frequency between 15.5KHz and 25KHz. Resolution up to 800 x 560, and supports both analog and TTL inputs. Thirteen-inch screen.

*Only* . . . . . $599



**EGA Card-** IBM® EGA compatible enhanced graphics adapter with 256KB display memory and high-resolution graphics mode. Displays 64 colors 16 at a time, and supports color, enhanced color, and monochrome displays.

*Only* . . . . . $179

### *More memory, more power...*

**MFC-** A six-function expansion card: 384KB RAM, serial port, parallel port, game port, clock-calendar with battery back-up, and utility software.

*Only* . . . . . $125

**AT-MFC-** for IBM® AT. Up to 1.5 MB memory expansion, serial & parallel port for IBM® AT.

*Only* . . . . . $139

**MEM-576-** Memory expansion card that fits in a short slot and supports either 64K or 256K chips. Comes with 0K, expandable to 192KB, 384KB, or 576KB.

*Only* . . . . . $39

**EMS-** Expanded-Memory-specification card compatible with the Lotus/Intel memory specification. Comes with 0K, expandible to 2MB. Includes utility software.

PC Version

*Only* . . . . . $109

AT Version

*Only* . . . . . $129

**Memory Chips-**

| | |
|---|---|
| 64K chips. | $9 |
| 64K chips (120ns) | $15 |
| 128K chips. | $49 |
| 256K chips (150 ns) | $29 |
| 256K chips (120ns). | $35 |

**Coprocessors-**

| | |
|---|---|
| 8087-3 | $129 |
| 8087-2 | $159 |
| 80287 | $219 |
| 80287-8 | $269 |

**AT I/O-** Serial port and parallel port.

*Only* . . . . . $75

**PC I/O-** Serial port, parallel port, game port, and clock-calendar with battery back-up.

*Only* . . . . . $79

# ... plus a one-year warranty!

## *Bentley Model "T"*

**Bentley Model "T"** Intel 8088 processing power in an IBM® XT compatible — runs at a keyboard-selectable 4.77 MHz or 8 MHz processing speed, a 70% increase from the original IBM® PC. Standard features include 256KB of random-access-memory expandable to 640KB, keyboard, diskette drive controller card, and 360KB diskette drive controller card, and a 360KB diskette drive.

**$395**

**Bentley Model "T"** 20MB hard disk model
Our famous Bentley Model "T", fully equipped with a 20MB hard drive. Features 65ms access-time.

**$764**

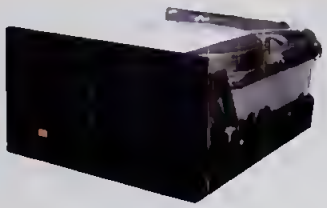
Monitor not included

Bentley
Computer Products

Amazing prices on quality computers and add-on products. Free UPS ground shipping in the continental U.S.A. No surcharge for MasterCard, VISA, COD, or cashier's check. Fortune 1000, university, and institution purchase orders accepted with approved credit. Phenomenal savings with a one-year warranty.

## Enhance your Bentley 286 with our popular AT add-on products...

### MiniScribe Hard Disk Drives



**High Quality • High Storage Capacity**
**High Perfomance • Low Price**

*One Year Warranty*

Both drives feature an average access time of 28 milliseconds. The drives' positioning systems use a tugged linear voice coil actuator that eliminates head skew problems common with other positioning mechanisims. Microprocessor-aided control provides fast, accurate head positioning. In addition, superior head/disk tracking is achieved through the use of Whitney technology head sliders and flexures. With MiniScribe's fail-safe actuator lock, the head positioner is retracted and locked at power-down, elimating data zone contact. Partitioning software is included so you can take advantage of the full storage capacity.

**42MB . . . . . $595** **70MB . . . . . $895**

**Tape Backups-** Avoid disk swapping
streaming tape for your IBM® AT, PC, or compatible

Stream-20 by Teac — For the PC . . . $580
Stream-60 by Wangtek — For the AT. . . . $757

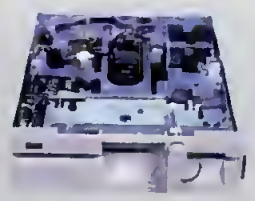
Bentley
Computer Products
1700 Still Meadow Cove Round Rock, Tx. 78681

**PC Hard Disk Kits-**
Quality 20MB and 30MB hard disk kits for the IBM PC and compatibles. Each kit includes a half-height Winchester hard disk, hard disk controller, cables, software, mounting hardware, and complete illustrated installation manual.

20MB . . . . . $375
30MB . . . . . $449
20MB
For the Compaq Portable $395

**LaserJet-** Fast and quiet laser printing from the world's leading laser printer manufacturer· Hewlett-Packard. The new Plus model has improved graphics capability.

*New Prices!*
LaserJet . . . . . $2285
LaserJet Plus. . . $2885



**Diskette Drives-**
Convenience and compatibility.

For PCs . . . . . $99
For ATs. . . . . $109

**Order Toll Free**
**800-331-6799**
**In Texas Call: 512-250-9897**

CIRCLE 359 ON READER SERVICE CARD

# Tecmar Set the Standard for Excellence in Tape Backup.

# Now We've Topped It.

## Introducing QT-125™

More than 70,000 users have already chosen Tecmar's popular QIC-60™ 60MByte tape backup systems to protect their data. And now, Tecmar's standard of excellence is available for an even wider range of applications.

***125MBytes for Massive Storage Backup!*** The Tecmar QT-125 is the new tape backup standard for massive data storage applications on an IBM PC/XT/AT® COMPAQ® 286, 386 and compatibles. For all the users with hard disks larger than 60MBytes—or those with a Novell, 3COM or IBM network—or any user seeking the absolutely lowest cost per megabyte in data storage, the new QT-125 packs 125MBytes on a single ¼-inch tape cartridge. You get easy-to-use automatic and unattended backup.

***The Fastest Backup!*** But 125MBytes is only part of the story, because QT-125 internal and external drives include Tecmar's new Q-TOS™ Quality Tape Operating Software which utilizes the unique Tecmar direct track seek feature. You can access any data file on the fifteen data tracks in a maximum of 90 seconds. Other systems take up to 22 minutes! All told, you get a fast 5MBytes per minute backup speed. And you can choose IBM 6157 streaming cartridge tape compatibility using SY-TOS software.

***Two-Year Warranty Plus.*** Best of all, with the QT-125 you get Tecmar quality backed by the industry's only two-year warranty including the new QuickTurn™ Quality Service program. If you have any trouble with your Tecmar QT-125 in the first six months of operation, we'll send you a replacement within 48 hours.

***Easy Availability.*** Tecmar products are available through ComputerLand,® BusinessLand,® Entre Computer Centers, Sears Business Systems Centers, and other fine dealers worldwide.

QUALITY SERVICE 800 344-4463 QuickTurn TECMAR

***Stay With the Leader.*** So, when you need tape backup, go for the top in quality, reliability and performance. It's Tecmar—again. Call Tecmar for more information at (216) 349-1009.

IBM PC/XT/AT are registered trademarks of International Business Machines Corp.; COMPAQ is a registered trademark of COMPAQ Computer Corp.; QIC-60 is a trademark of Colorado Memory Systems. ComputerLand is a registered trademark of ComputerLand Corporation. BusinessLand is a registered trademark of BusinessLand Corporation. SY-TOS is a trademark of Sytron, Inc.

**CIRCLE 237 ON READER SERVICE CARD**

TECMAR
a subsidiary of Rexon Inc.

## The Power Behind Your PC

Tecmar, Inc., 6225 Cochran Road, Solon, Ohio 44139-3377
Telephone: (216) 349-1009, Telex: 466692

Tecmar International, Inc., United Kingdom
Telephone: 44-785-214466, Telex: 851-36352

■ STEPHEN MANES

# CROSSED WIRES

*A short play in which the Unpaid Computer Consultant delves into on-line multitasking, the meaning of a warranty, and the learning curve of the average beginner.*

BOSS: May I inquire when we will receive your usual compendium of lame jests and stale news?
ME: Any day. Call Waiting problems.
BOSS: Huh?
ME: Certain editors, you recall, kept grousing about how hard it was to reach me. So even though everybody warned me about modem troubles, I shelled out for Call Waiting. I solved the modem problems, but . . . hey, hang on a second. If you get cut off, call back, OK? Hello?
FORMER FRIEND: I paid for a 20-meg Mulholland Drive, installed in my new computer. What I got was a 14.6-meg KimChee in a separate box from the machine. They said I wouldn't have any trouble putting it in.
ME: Take it back. It's not what you ordered. It's not what you want.
FORMER FRIEND: I can live with it. I hear the KimChee is more dependable than the Mulholland.
ME: Who told you that? The salesman?
FORMER FRIEND: Well, yeah. Besides, it's a 10-dollar cab ride each way. How about coming over to help set it up?
ME: Hold the line. Boss?
CRONY: Hey, how do I run this program of yours, anyway?
ME: Get to the DOS prompt, and . . .
CRONY: Wait a minute. What's "the DOS prompt"?
ME: You've had your PC for a year and you don't know what the DOS prompt is?
CRONY: Hey, all I ever use is that copy of *WordStar* my cousin lent me.
ME: Hang on. Boss?
ASSOCIATE: How's it going?
ME: No comment. Did you ever get *Paradox* up and running?
ASSOCIATE: You kidding? The dealer still hasn't installed the RAM upgrade.
ME: Did you pay for it?
ASSOCIATE: Unfortunately.
ME: How long has it been?
ASSOCIATE: Let's look at the calendar . . . 3 months and a week.
ME: For a dumb memory board? That's outrageous!
ASSOCIATE: They say there's a big demand.
ME: What about the keyboard?
ASSOCIATE: They can't get the one we ordered. They say this one's better.
ME: Naturally. And the fuzzy monitor?
ASSOCIATE: It's been 90 days since they promised to look at it. Now they say we should talk to IBM about a service contract.
ME: Maybe you should talk to IBM about taking away their dealer authorization.

Whoops, hold on a minute, OK?
BOSS: Hello?
ME: Don't hang up! Don't move!
ACQUAINTANCE: My monitor just blew out.
ME: Did you call the dealer?
ACQUAINTANCE: The dealer's out of business.
ME: Did you call the manufacturer?
ACQUAINTANCE: Yes. They said it was probably the fuse.
ME: Did you check it?
ACQUAINTANCE: I got the case open. I don't know what a fuse looks like.
ME: It's probably a little glass cylinder with metal at both ends.
ACQUAINTANCE: Oh, wait a second. Here's something marked "fuse."
ME: Did you unplug your machine first?
ACQUAINTANCE: Hey, good idea! Wait a second. . . . There! Now, what does a bad fuse look like?
ME: There's a little wire in the middle. It should be broken or melted or something.
ACQUAINTANCE: Looks OK to me.
ME: Put in another fuse and see if it works.
ACQUAINTANCE: Where do I get one?
ME: A TV repair shop. Radio Shack. Take the old one with you.
ACQUAINTANCE: Oh, great. I'm just glad this thing's still under warranty.
ME: Boss? Boss? Damn!
FORMER FRIEND: How's it going?
ME: Don't ask. Will they install the Mulholland?
FORMER FRIEND: I've been fooling around with the KimChee. Works fine. There's just one thing I can't figure out.
ME: [*Sigh*]

Illustration: Jennifer Skopp

# telemart

Doing Business Since 1980 A Division of CW Marketing, Inc.

ORDER LINE **1-800-426-6659**

## Your Hardware and Software Source

Low Prices are **BORN** Here, **RAISED** Elsewhere

★ NO CHARGE FOR VISA AND MASTERCARD ★
★OUR CUSTOMERS HAVE RATED US #1 IN PRICE & DELIVERY ★
★PURCHASE ORDERS ACCEPTED — ASK FOR NATIONAL ACCOUNTS ★

**Save Up To 60%**

**FREE** AIR EXPRESS SHIPPING
*You Pay the Ground*
*We Pay the Air*

# SOFTWARE

## ABSOLUTE
**Lowest Prices On MICROSOFT. Products**

## They're HOT & On Special
**With Prices To LOW To Print**
Call For Name Brand Popular Software Now on Special.
Ask Your Sales Rep. for Current Titles

## SPECIAL
**INNOVATIVE SOFTWARE**
**Smart System 3.1**
**Now With Lan**
**$409**

## SPECIAL
**Word Perfect/**
**Word Perfect Library Bundle**
**$245**

### GRAPHICS/MICE

| | |
|---|---|
| Chartmaster | Call |
| Diagram Master | Call |
| Energraphics 2.0 | 269 |
| Easy CAD | 295 |
| FastCAD | 1375 |
| Freelance Plus | Call |
| Generic CAD w/Dot Plot | 69 |
| Harvard Presentation Graphics | Call |
| IMSI Mouse (PC Mouse) w/Dr. Halo II | 92 |
| In-A-Vision | 259 |
| LogiMouse | 66 |
| LogiMouse w/Paint | 85 |
| Map Master | Call |
| Microsoft Buss Mouse 6.0 | 106 |
| Microsoft Chart | 164 |
| Microsoft Serial Mouse 6.0 | 119 |
| News Room | 31 |
| News Room Professional | 65 |
| PC Buss Plus Mouse (New Ver.) | Call |
| PC Mouse (New Ver.) | Call |
| Printmaster | 29 |
| Print Shop | 32 |
| Signmaster | Call |
| Turbo Graphix Tool Box | 38 |
| Windows Draw!! w/Clip Art | 163 |

### ACCOUNTING

| | |
|---|---|
| BPI – G/L, A/R, A/P, Payroll | New Low Price |
| Computer Associates – G/L, A/R, A/P | Call |
| DAC Easy Accounting | $ 38 |
| DAC Easy Payroll | 28 |
| In-House Accountant | 88 |
| One Write Plus | 140 |
| One Write A/R,A/P,Payroll | 125 |
| Open Systems-G/L,A/R,A/P,Payroll | 409 ea. |
| Time Slips | 60 |

### ACCESSORIES

| | |
|---|---|
| Copy II Option Board | $ 75 |
| Masterpiece | 84 |
| Masterpiece Plus | 113 |
| Microsoft Mach 10 w/Windows & Mouse | 335 |
| MousePad by Mousetrac | 9 |
| Summasketch 12x12 Tablet | 335 |

### DESKTOP PUBLISHING

| | |
|---|---|
| Click Art Personal Publisher | Call |
| Harvard Professional Publisher | Call |
| Newsmaster | $ 48 |
| Ventura Publishing | 575 |

### SPREADSHEETS

| | |
|---|---|
| HAL | $108 |
| Lotus 1-2-3 Ver 2.01 | Call |
| Lotus Manuscript | 339 |
| Lotus Report Writer | 99 |
| Multiplan 3.0 | 108 |
| Silk | 73 |
| Spreadsheet Auditor 3.0 | 82 |
| Supercalc 4 | 269 |
| Twin Classic | 39 |
| VP Planner | 47 |
| Words & Figures | 109 |

### DATA BASE MANAGEMENT

| | |
|---|---|
| Clipper | Call |
| Cornerstone | $ 53 |
| dBase II | 289 |
| dBase III Plus | 395 |
| dBase III LAN | 589 |
| DB-XL | 82 |
| Genifer | 188 |
| Knowledgeman II Promo Pack | 319 |
| Paradox | Lowest Price |
| PFS: Professional File | Call |
| Q'& A | 199 |
| Quickcode Plus | 138 |
| QuickReport | 138 |
| Rapid File | 239 |
| Revelation | 449 |
| Revelation Bump Disk | 249 |
| R:Base Clout (New Ver.) | 149 |
| R:Base Extended Report Writer (New Ver.) | 149 |
| R:Base 5000 System V | 355 |
| R:Base Graphix | 139 |
| Reflex | 22 |
| VP Expert | 47 |
| VP Info | 47 |

### PROJECT MANAGEMENT

| | |
|---|---|
| Harvard Total Project Manager II | Call |
| Microsoft Project | 219 |
| Super Project Plus | 269 |
| Timeline 2.0 | Call |

### INTEGRATIVE SOFTWARE

| | |
|---|---|
| Ability | $ 55 |
| Enable 2.0 | 329 |
| Framework II | 395 |
| Open Access II | 285 |
| PFS: 1st Choice | Call |
| Smart Software System | 399 |
| Symphony | Call |

### WORD PROCESSORS

| | |
|---|---|
| Easy Extra | $ 79 |
| Leading Edge Word Processor | 25 |
| Leading Edge W/P with Spell & Merg | 59 |
| Lightening | 55 |
| Microsoft Word 3.1 | 249 |
| Multimate 3.3 | 249 |
| Multimate Advantage | 299 |
| PFS: Professional Write | Call |
| Smart Spell Checker | 68 |

### LANGUAGES

| | |
|---|---|
| Basic Compiler (Microsoft) | $219 |
| C Compiler (Microsoft) | 249 |
| Cobol Compiler (Microsoft) | 386 |
| Fortran Compiler (Microsoft) 4.0 | 249 |
| Lattice C Compiler | 236 |
| Macro Assembler (Microsoft) | 84 |
| Run C Interpreter | 65 |
| Ryan McFarlan Fortran | 305 |
| Ryan McFarlan Cobol | 479 |
| Pascal Compiler (Microsoft) | 166 |
| Quick Basic 2 | 55 |
| Turbo Jumbo Pack (New Ver.) | 159 |
| Turbo Pascal w/8087 & BCD | 55 |
| Turbo Prolog | 54 |
| Turbo DataBase Tool Box | 38 |

### TRAINING

| | |
|---|---|
| Flight Simulator | $ 28 |
| Mastertype | 23 |
| Mind Prober | 25 |
| MS Learning DOS | 28 |
| PC Logo | 69 |
| Turbo Tutor II | 23 |
| Typing Instructor | 27 |
| Typing Tutor III | 27 |

### MONEY MANAGEMENT

| | |
|---|---|
| Dollars & Sense w/Forcast | $ 92 |
| Tobias Managing Your Money | 105 |

### COMMUNICATIONS

| | |
|---|---|
| CompuServe Starter Kit | $ 19 |
| Crosstalk XVI | 88 |
| Microsoft Access | 139 |
| Mirror | 38 |
| Remote | 88 |
| Smartcom II | 82 |

### DISKETTES

| | |
|---|---|
| Maxell MZS (Qty 100) | $ 85 |
| Sony MD-2 (Qty 100) | 85 |

| | |
|---|---|
| Volkswriter 3 | 136 |
| Volkswriter Deluxe Plus | 59 |
| Volkswriter Scientific | 235 |
| Webster New World Writer | 72 |
| Webster Spell Checker | 33 |
| Webster Thesaurus | 39 |
| Word Perfect Library | 54 |
| Word Perfect (Ver 4.2) | 195 |
| Wordstar w/Tutor 3.31 | 162 |
| Wordstar Pro Pack 3.31 | 233 |
| Wordstar 2000 2.0 | 233 |
| Wordstar 2000 Plus 2.0 | 278 |
| Word Wizard | 38 |

### UTILITIES

| | |
|---|---|
| Brooklyn Bridge | Call |
| I DIR Plus | $ 46 |
| Carousel 2.0 | 29 |
| Copy II PC | 19 |
| Copywrite | 40 |
| Cruise Control | 21 |
| Cubit | 25 |
| Disk Optimizer 2.0 | 29 |
| Double DOS 4.0 | 25 |
| DS Back-Up Plus | 25 |
| Fastback | 84 |
| Homebase 2.5 | Call |
| Gem Collection | 109 |
| Gem Draw Plus | 169 |
| Keyworks | 49 |
| Microsoft Windows | 55 |
| Norton Commander | 36 |
| Norton Utilities 4.0 | 48 |
| Note It | 58 |
| PC Tools | 19 |
| Printworks | 36 |
| Prokey 4.0 | 69 |
| Sidekick (Unprotected) | 47 |
| Sideways 3.1 | 34 |
| Smart Notes | 40 |
| SQZ | 46 |
| Superkey | Call |
| Take Two | 79 |
| Traveling Sidekick | 37 |
| Turbo Editor Tool Box | 38 |
| Unlock A or B Plus | 32 |
| Unlock D Plus | 43 |
| XTree | 25 |

### DISKETTES

| | |
|---|---|
| Sony 3½ SS/DD Qty 100 | 120 |

# MiT SYSTEMS

## TURBO PC/XT

**256K Memory, 360K Brand Name Floppy Drive, 135 Watt Power Supply Slide Case, AT Style Keyboard, 4-8MH$_z$ Clock Speed, (Keyboard Selectable), 8 Expansion Slots**

**FCC Approved**
**Non-Infringing Bios**
***All First Quality Materials***
**1 Year Limited Warranty**
**IBM Compatible**

# $389

## SPECIAL

*Over $200 worth of Paperback Software Programs*

PAPERBACK SOFTWARE

INCLUDES:
Paperback Writer
Paperback Speller
Number Works
Draw It

**$39** *with each system*

| | |
|---|---|
| Turbo PC/XT w/640K & 1 Drive | $ 439 |
| Turbo PC/XT w/640K & 2 Drives | $ 519 |
| Turbo PC/XT w/640K, 1 Drive & 20 MG | $ 819 |
| PC/AT MHz w/512K, 1.2 Floppy Drive | $1039 |
| PC/AT 10 MHz w/1024K, 1.2 Floppy Drive | $1089 |
| PC/AT 10 MHz w/1024K, 1.2 Floppy, 30 MG | $1679 |
| MonGraphics Card with Parallel Printer Port | $ 69 |
| Color Card w/Parallel Printer Port | $ 65 |
| Multifunction Card w/Software | $ 79 |
| Amber Monitor (TTL) | $ 89 |
| Amber Monitor w/Swivel Tilt | $ 99 |
| Color Monitor (RGB) | $ 279 |
| Sega Enhanced Graphics Card | $ 165 |
| I/O Card (Serial/Parallel) | $ 38 |
| I/O Card (Serial/Clock Calendar) | $ 39 |
| Enhanced Keyboard | $ 65 |
| XT Rocket 286 Card | $ 255 |
| XT Multi I/O Card | $ 55 |

# HARDWARE

### PRINTERS

| | |
|---|---|
| **Alps** | |
| All Models | Call |
| **Brother Printers** | Call |
| **Citizen Printers** | |
| MSP-10 | $ 269 |
| MSP-15 | 359 |
| MSP-20 | 309 |
| MSP-25 | 459 |
| Premier 35 | 445 |
| 120D | 169 |
| Diablo D-25 | 469 |
| 635 | 759 |
| **Dyconics** | |
| 150 | 299 |
| **Epson Printers** | Call |
| **NEC** | |
| 3510, 3550, | 729 |
| 8810, 8850 | 1045 |
| P-6 | 429 |
| P-7 | 609 |
| P-9 | Call |
| **Okidata** | Call |
| **Panasonic** | |
| 1080 I | 189 |
| 1091 I | 245 |
| 1092 I | 319 |
| 1592 | 385 |
| 1595 | 465 |
| 3131 | 229 |
| 3151 | 369 |
| **Star Micronics** | Call |
| **Toshiba** | |
| 321 | 665 |
| 341 E | 665 |
| 351 Model II | 899 |
| 351 Color | 1029 |

### BOARDS

| | |
|---|---|
| **AST** | |
| Six Pack Plus | 149 |
| **ATI** | |
| EGA Wonder | 245 |
| **Hercules** | |
| Color Card | 145 |
| Graphics Card | 175 |
| **Intel** | |
| Above Board PC | 210 |
| PS/PC | 239 |
| Above Board AT | 315 |
| Above Board PS/AT | 345 |
| **Orchid** | |
| EGA | 565 |
| PC Turbo 186 w/W/256K | 355 |
| Tiny Turbo | 415 |
| **Paradise** | |
| EGA Autoswitch | 305 |
| 5 Pack | 99 |
| **Plus Development** | |
| Plus Hard Card 20 Megabyte | 609 |
| **Quadram** | |
| Quad EGA Plus | 329 |
| **Tecmar** | |
| Graphics Master | 409 |
| Captain (No Memory) | 109 |
| **Video-7** | |
| Vega Deluxe | 335 |
| Enhanced Graphic Adaptor | 279 |

### DISK DRIVES

| | |
|---|---|
| **Bernoulli Box** | |
| 10 Meg | $1195 |
| 20 Meg | 1595 |
| 40 Meg | 2325 |
| **Segate 20 MG w/W/D Controller** | 385 |

### TERMINALS

| | |
|---|---|
| **Qume** | |
| 101 Plus Green | $ 315 |
| 101 Plus Amber | 315 |
| **Wyse** | |
| 30 | 285 |
| 50 | 359 |
| 75 | 565 |
| 85 | 425 |

### MODEMS

| | |
|---|---|
| **Anchor Automation** | |
| Anchor Express | $ 185 |
| **Hayes** | |
| 300 | 129 |
| 1200 | 375 |
| 1200B | 309 |
| 2400B | 460 |
| **Prometheus** | |
| 1200B w/Software | 129 |
| **US Robotics** | |
| Password 1200 | 165 |
| Courier 2400 E | 369 |
| Microlink 2400 | 349 |

### PLOTTERS

| | |
|---|---|
| Epson HI-80 w/HPGL | $ 345 |

### MONITORS

| | |
|---|---|
| Amdek Monitors | Call |
| **NEC** | |
| Multisync | $ 575 |
| Other Models | Call |
| Princeton Graphics Monitors | Call |
| Zenith Monitors | Call |

### COMPUTERS

| | |
|---|---|
| **AST** | |
| Model 80 | $1399 |
| Model 120 | 2099 |
| Model 140 | 2449 |
| **Pansonic** | |
| Business Partner | $ 719 |
| Sr Partner | 979 |
| Exec Partner Dual Drive | 1429 |
| **Toshiba** | |
| T-1100 Supertwist | 1399 |
| T-3100 | Call |
| **Wyse** | |
| 286 | 1729 |

## COPIERS

Canon PC-25 – $929

VISA

MasterCard

- **No Charge for VISA and Mastercard**
- You Pay the Ground Shipping – We Pay the Air
- Ground Shipping & Handling $6.00
- Free Air applies ONLY to orders up to 10 lbs & Over $50
- All product carries a manufacturer's warrantee. All Guarantees, rebates, trial period privileges & promotional programs are handled by the manufacturer only

- No APO, FPO, or international orders, please
- Call before submitting P.O. Numbers
- Personal and Company Checks Will Delay Shipping 2 weeks
- Prices & Availability Subject to Change Without Notice
- Add 3% for C.O.D. Orders
- **All Sales Are Final**

**Mailing Address:**
2222 East Indian School Road / Phoenix, Arizona 85016
- Order Line Hours: Monday-Friday 7:00 a.m. - 6:00 p.m. Saturday 9:00 – 1:00
- Alaska Orders Call (602) 468-1731
- Order Processing (602) 224-9345 10:00 a.m.-3:00 p.m. Monday-Friday

CIRCLE 206 ON READER SERVICE CARD

■ STEPHEN MANES

FORMER FRIEND: When the machine starts up, it displays the memory check.
ME: Normal.
FORMER FRIEND: But after that, it starts over. The only way to run my own programs is to press Ctrl-Break first.
ME: Not normal. Take it back.
FORMER FRIEND: Also, the reset switch doesn't work.
ME: Forget it. Get your money back. Tell 'em you'll refuse to pay the Visa bill.
FORMER FRIEND: I can't. They said they'd have to charge extra unless I gave them a certified check.
ME: Didn't I tell you never to . . .
FORMER FRIEND: I know, I know. But they seemed to know what they were talking about, and . . .
ME: Don't hang up. Hello?
BETA TESTER: I can't get your program to work at all.
ME: It needs 256K. How much memory do you have?
BETA TESTER: 640K.
ME: Are you using memory-resident programs?
BETA TESTER: Six or seven.
ME: How much free memory do you have?
BETA TESTER: I told you, 640K. No?
ME: No.
BETA TESTER: How do I find out?
ME: Run CHKDSK.
BETA TESTER: Did I buy that?
ME: Hang on a second. Boss?
ACQUAINTANCE: It wasn't the fuse.
ME: Consult your dealer. Oh, sorry. . . . Did you try the manufacturer?
ACQUAINTANCE: They claimed any authorized dealer could fix it. I called two. I didn't buy it there so they won't fix it.
ME: Send it back.
ACQUAINTANCE: Factory service'll take a month. They're back-ordered.
ME: Hold on a second. Hello?
BOSS: Cut me off again, and I'm going to run that picture of you using the TI 99/4.
ME: I told you. Call Waiting problems.
BOSS: I'll say. Where were we?
ME: I was saying the phone hardly ever rings while my PC is on-line, except to knock me off-line when I'm down to the very last block of an 80K file transfer. However, I now have a program to get around that problem.
BOSS: Yeah, what's it called?
ME: Federal Express. With any luck, you'll get the disk by 10:30 tomorrow.
BOSS: What's it about, anyhow?
ME: Remember when you said nobody's a PC beginner for more than five minutes?
BOSS: Yeah.
ME: Well, I don't entirely. . . . Listen, hang on just one second. Hello?
CRONY: Are you going to tell me what that DOS prompt thing is, or what? PC

PC TOOLS™

***"...a worthwhile addition to any software library."*** *PC Magazine*

***"...one big program that simplifies almost any disk-oriented task..."*** *PC Magazine*

PC Tools puts together all the popular features of the Norton Utilities* with a powerful DOS interface and makes them resident like Sidekick*. So you can execute virtually any DOS command even when you're using another program!

**With PC Tools, you can**

- **UNDELETE** an accidentally erased file.
- **FORMAT** a disk.
- **COPY** files.
- **MOVE** files and reorganize subdirectories with ease.
- **LOOK** at (and even edit) a file.
- **SEARCH** for a file name or text within a file.
- **PRINT** a file (as text or hex and ASCII).

**And much more!**

**All without ever leaving your spreadsheet or database manager or word processor or...**

**System Requirements:** IBM or compatible, 256K, uses only 64K in resident mode. Supports floppy disks, hard disks and 3½" disks, as well as the Lotus/Intel expanded memory!

**To Order: Call 503/244-5782, 8-5** (West Coast time), M-F, with your VISA in hand. Or send a check for $39.95 US $, + $3 s/h, $8 overseas.

**$39.95**

*Central Point Software*
INCORPORATED
*9700 SW Capitol Hwy. #100*
*Portland, OR 97219*

***PC Magazine names PC Tools their Editor's Choice and adds, "There's no reason to look beyond PC Tools..."***

*We also have backup utilities for the IBM, Macintosh, Apple //, Commodore 64/128 and Atari ST.*

*Norton Utilities and Sidekick are registered trademarks of Peter Norton and Borland International, respectively

CIRCLE 120 ON READER SERVICE CARD

# 12MHz SPEED . . .
# . . . plus A MEGABYTE FOR DOS!

## THEY ALL NEED NUMBER SMASHER/ECM™

**Turn your PC or XT into the machine it should have been!** The 12 MHz Number Smasher/ECM is the fastest accelerator on the market. It is also the most powerful, providing a **true megabyte** for DOS!

**To break the 640K DOS barrier** MicroWay designed a Memory Management Unit (MMU) that is tailored to DOS plus a 2000 byte resident driver – MegaDOS™. MicroWay calls this breakthrough Extended Conventional Memory. When you type CHKDSK with the board installed, your system will report 1,036,288 bytes total memory and 1,010,016 bytes free! Any conventional DOS program can utilize a full megabyte for data or *code* without changing a byte.

**Downloading a mainframe application?** ECM memory runs with any program that uses DOS for screen services including RM and MS FORTRAN and MS and LATTICE C! This means you have an additional 384K available for oversized applications. Programs which write directly to the screen require a simple patch to adhere to the new standard. MicroWay has already developed patches for the Lotus, WORDSTAR and AUTOCAD screen drivers. Release 1A of 1-2-3 jumps from 535,516 to 916,444 bytes available and runs faster than Release 2 for most worksheets.

**Number Smasher/ECM is 100% compatible** with all hardware and software including EMS and EGA boards. The compatibility is a result of control: its speed is switch, keyboard or software selectable from 4.77 MHz to 12.0 MHz. Applications which have not been upgraded to ECM can still be run by setting DOS to 640K or 704K and using the memory above DOS for I/O enhancers.

**Number Smasher/ECM runs floating point bound programs faster** than an AT or any other 80286 based machine. In fact, Number Smasher's 12 MHz 8087 runs a factor of three faster than the standard 80287 on the AT, delivering up to 125 kflops. Software is included for RAM Disk, print spooler, and disk caching, which speeds up floppy and hard disks by a factor of 2 to 10!

**Number Smasher/ECM is the most cost effective productivity tool you can buy.** The base board which runs at 9.54 MHz comes with 512K and costs only $599! The complete system which includes a motherboard accelerator, one megabyte of memory and a 12 MHz 8087 is just $1199. Call today to discuss your particular configuration. Remember: *"The advantage of buying from MicroWay is outstanding personal service."* (PC Magazine, 6/10/86 – p. 162)

**MicroWay**

*The World Leader in 8087 Support*

*P.O. Box 79, Kingston, Mass. 02364 USA (617) 746-7341*
*32 High St., Kingston-Upon-Thames, U.K., 01-541-5466*

Number Smasher, ECM and MegaDOS are trademarks of MicroWay, Inc. MicroWay is a registered trademark of MicroWay, Inc.

CIRCLE 159 ON READER SERVICE CARD

THE MIGENT POCKET MODEM™ A STATE-OF-THE-

It's ironic. These days, modems bring the world to you at the speed of light. But for all their awesome speed and power, these high-performance machines just sit there on your desk like a low-tech toaster.

But now, we're introducing the Migent Pocket Modem. It's 100% Hayes-compatible, so it works with virtually any PC: IBM, Apple, or whatever. It runs at both 300 and 1200 bps. It has a full set of Hayes AT commands. A 28-character non-volatile memory. Remote ring and tone sensing. Busy and dial tone monitoring. And even dual phone jacks.

But that's where all similarities end. The whole modem is smaller than a 3" x 5" card and works on a 9 volt battery or AC power. So you can put it in your shirt pocket or briefcase, and take it home, on the road, or anywhere else you need your PC.

The Migent Pocket Modem. If you'd like to know more, send in this coupon or call **800-633-3444,** Dept. 602, and ask for Alexis. We'll send you full information and the name of your nearest dealer. But in the meantime, you may be wondering why this modem isn't beige like the rest. Because we think it's about time a high-powered information machine looked like one.

CIRCLE 384 ON READER SERVICE CARD

☐ Please send me more information about the Migent Pocket Modem. And send me the name of the dealer in my area

NAME

ADDRESS

CITY STATE ZIP

PHONE

MIGENT™

Send to: Migent, Inc., 885 Tahoe Blvd., Call Box 6, Dept. 602, Incline Village, Nevada 89450-6062, Attn: Alexis

Registered trademarks: Apple, Apple Computer; Hayes, Hayes Microcomputer Products, IBM, International Business Machines. Trademark: Pocket Modem, Migent.

**ART INFORMATION MACHINE THAT LOOKS LIKE ONE.**

# Softline PRICE BUSTERS

## Software

### Word Processing/ Desktop Publishing

| | |
|---|---|
| FANCY FONT | $139 |
| FINAL WORD II | $239 |
| HARVARD PROFESSIONAL PUBLISHER | $459 |
| MICROSOFT WORD 3.0 | $279 |
| MULTIMATE | $249 |
| MULTIMATE ADVANTAGE | $299 |
| LOTUS MANUSCRIPT | $359 |
| OFFICE WRITER/ SPELLER 5.0 | $259 |
| PFS: PROF WRITE | $129 |
| SAMNA WORD IV | $349 |
| SPELLBINDER DESKTOP PUBLISHER | $459 |
| TURBO LIGHTNING | $ 95 |
| VOLKSWRITER 3 | $159 |
| WORD PERFECT 4.2 | $209 |
| WORDSTAR 2000 + | $269 |
| XYWRITE III | $199 |

### Database Systems

| | |
|---|---|
| CLIPPER | $ 349 |
| CONDOR III | $ 339 |
| DBASE III PLUS | $ 399 |
| FOXBASE + | $ 299 |
| GENIFER | $ 219 |
| KMAN 2 | $ 319 |
| PARADOX | $ 449 |
| PFS: PROF FILE | $ 149 |
| Q&A | $ 229 |
| QUICKSILVER | $ 359 |
| R BASE SYSTEM V | $ 359 |
| RAPIDFILE | $ 249 |
| REFLEX | $ 69 |
| REVELATION | $ 459 |

### Spreadsheets/ Integrated Packages

| | |
|---|---|
| ENABLE | $ 349 |
| FRAMEWORK II | $ 399 |
| JAVELIN | $Call |
| LOTUS 1-2-3 | $ 319 |
| MULTIPLAN | $ 125 |
| OPEN ACCESS II | $ 295 |
| PFS: FIRST CHOICE | $ 109 |
| SMART SYSTEM | $ 439 |
| SPREADSHEET AUDITOR | $ 99 |
| SUPERCALC 4 | $ 319 |
| SYMPHONY | $ 449 |
| VP PLANNER | $ 59 |

### Communications/ Productivity Tools

| | |
|---|---|
| CARBON COPY | $ 129 |
| CROSSTALK XVI | $ 99 |
| CROSSTALK MKIV | $ 139 |
| PROKEY | $ 65 |
| RELAY GOLD | $ 159 |
| REMOTE | $ 109 |
| SMARTERM | $Call |
| SMARTCOM II | $ 99 |
| SUPERKEY | $ 55 |

*CALL FOR SHIPPING COSTS


## THE INCREDIBLE JACK2 "Electronic Workspace" from PECAN™

Do Wordprocessing, Spreadsheets, Database and Graphics all on one screen at the same time.

Normally priced at ~~$99.95~~

NOW $9.95

with purchase over $1,000.


### Graphics

| | |
|---|---|
| CHARTMASTER | $209 |
| CLICKART | $119 |
| DIAGRAPH | $309 |
| DIAGRAM MASTER | $189 |
| ENERGRAPHICS 2.0 | $295 |
| FREELANCE PLUS | $359 |
| OEM DRAW + | $169 |
| GRAPHWRITER COMBO | $349 |
| HARVARD PRESENTATION GRAPHICS | $235 |
| IN-A-VISION | $259 |
| MAPMASTER | $219 |
| MS CHART | $185 |
| PC DRAW | $209 |
| PC PAINTBRUSH PLUS | $109 |
| PICTURE PERFECT | $245 |
| PRODESION II | $179 |
| SIGNMASTER | $135 |
| WINDOWS/DRAW | $115 |

### Statistics

| | |
|---|---|
| SPSS/PC + | $699 |
| STATGRAPHICS | $459 |
| STATPAC GOLD· WALONICK | $399 |
| SYSTAT | $469 |

### Network Applications

| | |
|---|---|
| CROSSTALK XVI | $419 |
| DBASE III LAN PAK | $599 |
| KMAN 2 | $599 |
| MULTIMATE | $639 |
| MULTIMATE ADVANTAGE | $749 |
| REVELATION | $999 |
| WORD PERFECT SERVER | $309 |
| WORD PERFECT STATION | $ 75 |

### Desktop Environments

| | |
|---|---|
| GEM DESKTOP | $39 |
| MS WINDOWS | $65 |
| SIDEKICK | $59 |

### Project Management

| | |
|---|---|
| HARVARD TOTAL PROJECT MANAGER | $279 |
| MICROSOFT PROJECT | $249 |
| PROJECT SCHEDULER NETWORK | $339 |
| SUPERPROJECT PLUS | $319 |
| TIMELINE 2.0 | $239 |

### Accounting

| | |
|---|---|
| BPI | $ 309 |
| GREAT PLAINS | $ 499 |
| COMPUTER ASSOC | $ 399 |
| ONE WRITE PLUS | $ 159 |
| OPEN SYSTEMS | $ 409 |

### Languages/Utilities

| | |
|---|---|
| APL + V6.0 | $ 369 |
| COPYWRITE | $ 45 |
| FASTBACK | $ 59 |
| LATTICE C | $ 239 |
| MICROSOFT C COMPILER | $ 239 |
| MS BASIC COMPILER | $ 249 |
| MS FORTRAN | $ 229 |
| NORTON UTILITIES | $ 59 |
| QUICK BASIC | $ 69 |
| TURBO PASCAL | $ 69 |
| TURBO PROLOG | $ 69 |
| XENIX | $Call |

## Hardware*

### Emulation Boards

| | |
|---|---|
| AST 5211-11 + | $ 645 |
| AST 5251-12 | $ 499 |
| AST BSC | $ 469 |
| AST SNA | $ 599 |
| FORTE | $Call |
| IRMA | $ 725 |
| SMART ALEC 5251 | $ 659 |

### Multifunction Boards

| | |
|---|---|
| AST ADVANTAGE (128K) | $ 349 |
| AST 6 PAK PLUS (64K) | $ 169 |
| AST I/O MINI II | $ 199 |
| AST PREMIUM PAK | $ 185 |
| AST RAMPAGE PC | $ 279 |
| AST RAMPAGE AT | $ 439 |
| INTEL ABOVEBOARD | $Call |
| JRAM AT-3 (0K) | $ 259 |
| JRAM 3 (0K) | $ 199 |
| PC TURBO 256 (1MB) | $ 799 |
| PC TINY TURBO 256 | $ 459 |
| QUADBOARD (0K) | $ 109 |

### Modems

| | |
|---|---|
| AST REACH 1200 | $359 |
| HAYES 1200 | $385 |
| HAYES 1200B | $349 |
| HAYES 2400 | $579 |
| HAYES 2400B | $549 |
| TRANSNET 1000 | $279 |
| US ROBOTICS 1200B | $109 |
| US ROBOTICS 2400B | $155 |
| VENTEL 1200 HALF CARD | $365 |
| VENTEL 1200 PLUS | $299 |
| WATSON | $339 |

### Display Boards

| | |
|---|---|
| ATI EGA WONDER + | $279 |
| HERCULES GRAPHICS CARD PLUS | $159 |
| HERCULES COLOR CARD | $159 |
| ORCHID TURBO EGA | $615 |
| PARADISE AUTO SWITCH EGA | $365 |
| QUADRAM EGA + | $339 |
| SIGMA COLOR 400 | $449 |
| STB EGA PLUS | $299 |
| TECMAR EGA MASTER | $299 |
| TSENG ULTRA PAK | $429 |
| TSENG EVA 480 | $359 |

### Mass Storage/Backup

| | |
|---|---|
| IOMEGA 10 + 10 W/INTFC | $1599 |
| IOMEGA 20 + 20 W/INTFC | $2599 |
| IRWIN 120D 20MB TBU | $ 469 |
| IRWIN 145AT 40MB TBU | $ 579 |
| MOUNTAIN DRIVECARD 20MB | $ 599 |
| PLUS HARDCARD 10MB | $ 569 |
| PLUS HARDCARD 20MB | $ 699 |
| PRIAM 42MB AT | $ Call |
| SEAGATE 20B W/INT | $ 389 |
| SYSGEN SMART IMAGE 20MB (INT) | $ 625 |
| TALLGRASS | $ Call |
| TECMAR OIC-60AT TBU (INT) | $1199 |

### Monitors

| | |
|---|---|
| AMDEK 310A | $159 |
| AMDEK 600/722 | $429/539 |
| NEC MULTISYNC | $599 |
| PRINCETON HX-12 | $449 |
| PRINCETON MAX-12E | $179 |
| PRINCETON HX-12E | $539 |
| PRINCETON HX-9 | $529 |
| SONY MULTISCAN | $699 |
| TAXAN 122 AMBER | $155 |
| TAXAN 650 / 760 | $599 / 575 |

### Networks

| | |
|---|---|
| AST PC NET | $Call |
| ORCHID PC NET | $Call |

### Printers/Plotters

| | |
|---|---|
| EPSON EX-1000 | $ 615 |
| ESPON FX-85 | $ 399 |
| EPSON FX-286E | $ 579 |
| EPSON LQ-800 | $ 569 |
| EPSON LQ-1000 | $ 769 |
| HP 7475A | $1499 |
| NEC 3550 | $ 799 |
| OKIDATA 192 + | $ 389 |
| OKIDATA 193 + | $ 559 |
| OKIDATA 292 | $ 539 |
| OKIDATA 293 | $ 689 |
| TOSHIBA P321 | $ 499 |
| TOSHIBA P341 E | $ 799 |
| TOSHIBA P351 MODEL 2 | $1199 |

### Input Devices

| | |
|---|---|
| KEYTRONICS 5151 | $169 |
| KEYTRONICS 5153 | $299 |
| MICROSOFT MOUSE | $129 |
| PC MOUSE W PAINT + | $129 |

### Accessories

| | |
|---|---|
| CURTIS RUBY | $ 55 |
| DATASHIELD S-100 | $ 75 |
| GILTRONIX SWITCHES | $Call |
| LOGICAL CONNECTION | $ 259 |
| MASTERPIECE PLUS | $ 135 |
| MICROFAZER II | $ 265 |
| 256K RAM SET | $ 39 |
| 8087 MATH CHIP | $ 119 |
| 80287 MATH CHIP | $ 199 |

CIRCLE 101 ON READER SERVICE CARD

**FREE SHIPPING**
on all orders over $1000.00, credit card orders and prepaid orders.

**Our Policy.**
• Visa or Mastercard — add 3% • COD — Cash, M.O. or bank check only — add $5.00 per order • Prepaid personal or company check — allow two weeks to clear • No sales tax on orders shipped out of N.Y. State • Shipping via UPS surface — add $3.00 per item. UPS Blue — add $8.00 per item • All returns require prior authorization • Prices subject to change, call for latest prices

MasterCard VISA **1-800 221-1260**

In New York State call (718) 438-6057

Softline

P.O. Box 77[illegible], Brooklyn, N[illegible] 1123[illegible]
TELEX: 421047 ATLN UI
FAX: 718-972-8346

■ STEWART ALSOP

# REAL EXPANDED MEMORY

*DOS's inability to keep up with the new frontiers offered by cheap memory are frustrating many. Others have a hardware-based expansion plan.*

A whole new trend has arisen in the personal computing world, one that explains the recent good fortune of the manufacturers and promises to turn the business on its ear. I call this trend the Power Multiplication Factor. Let me explain.

As any user of an IBM PC or compatible knows, the machine (or more properly, its operating system) currently allows applications programs to address only 640K bytes of memory. This limit is fairly frustrating, since many of the newest and most powerful programs—*Paradox*, *Q&A*, *Manuscript*, and *Microsoft Windows*, to name just a few—use as much of that memory as they can get their hands on, leaving very little room for anything else, such as memory-resident accessories, other applications, or data.

Several companies have come up with partial solutions. The Expanded Memory Specification (EMS), developed by Lotus, Intel, and Microsoft, lets your applications program send chunks of data in 16K-byte "pages" up into memory above 1 megabyte. The Enhanced Expanded Memory Specification (EEMS), developed by AST Research, Quadram, and Quarterdeck, lets an application send chunks of both data and program code in 64K pages up into memory above 1 megabyte.

But both of these specifications are troublesome, since they can be supported only by certain applications and provide solutions only to people who use one particular applications program a lot (since applications can't share that expanded memory simultaneously).

**ADOS HOLDOUTS** Most people have been waiting anxiously for a new operating system, commonly referred to as either ADOS (for Advanced DOS) or protected-mode DOS, to solve this memory problem, since ADOS will reportedly be able to address as much memory—16 megabytes—as the 80286 processor can address. With the arrival of the 80386 processor, some companies have developed control programs, software that will fool the existing DOS into using the protected mode of the 80386 processor as though there were multiple computers, thereby getting more than 640K bytes of memory and multiple applications running at the same time. ADOS, though, will work only on 80286-based computers and recently has seemed more fractious than problem solving. And the control programs work only on 80386-based computers, which most of us don't have.

Instead, frustrated corporate users have taken the initiative and adopted an entirely different approach, one that I call the Expanded Computer Specification (XCS). These users, in order to acquire true multitasking and more memory than 640K, have acquired one or more extra computers. Just two computers will give you access to 1,280K of memory, at least two applications, and numerous accessories. Three computers will give you nearly 2 megabytes of directly addressable memory. Why wait for technology to catch up when you can just put two computers on your desk?

Illustration: Jennifer Stopp

Indeed, there are numerous schemes for maximizing the performance of XCS. One investment-oriented user I know dedicates one machine, an XT compatible, to running Lotus's *1-2-3*, *Hal*, and *Signal*, using the extra 2 megabytes on an Intel Above Board as EMS memory. Then he bought an extra computer, an inexpensive PC compatible, to act as his personal servant, running only memory-resident accessories (right up to the 640K limit).

Another user I know really likes *Windows*. Since there aren't very many *Windows* applications on the market, he keeps one machine to run his old character-based applications and bought a high-speed AT compatible with a fast hard disk just to run *Windows* with *PageMaker*, *Dragnet*, *Intalk*, and *Windows Draw*. This movement toward multiple computers per user is the Power Multiplication Factor.

Soon after IBM introduced the PC AT in 1984, analysts began to observe a new phenomenon in the personal computer business: corporate power users (namely

■ **STEWART ALSOP**

those people with big purchasing authority or clout) were justifying the purchase of these new machines by giving their old machine to someone less powerful down the hall. At the time, hand-me-down computers were the state of the art in finding ways to acquire the latest and greatest new machine. But it still created an average of only one computer per user.

Now XCS is just beginning to pop up in the most forward-thinking companies, and it promises to dramatically increase the ratio of computers to users. If, as I think it will, this trend explodes as ADOS versions get later and later, then it will create an explosion in the sales of all personal computers. Some nutcakes may even decide to make their second or third computer a Macintosh. (Indeed, the trend is reminiscent of the time in the 1950s when the Japanese companies figured out that the average middle-class American family would buy a second car, as long as it was inexpensive and reasonably reliable. That realization got Toyota and Nissan their start in the U.S. market. Look where the Japanese are now in the automobile market.)

In addition, if people do decide that having more than one computer is the way to go, it could finally bring local area networks into the mainstream of personal computers. As long as people are going to put more than one computer on their desk, why should they have to worry about which hard disk has a file or whether the floppy disk in both computers are compatible? A small network would solve that problem easily and would introduce users to all the intricacies of local area networks in a very nonthreatening way.

With a local network—a truly personal network—users could experiment by sending electronic mail to themselves (never forget anything; just send a reminder to your other computer) or by trying to do two sorts on the same data file simultaneously (see how easy it is to bring your system down). Indeed, true power users could spend their time running PC Labs benchmarks tests on both computers, just to see which one was really faster, and then send obnoxious messages from the faster computer to the slower.

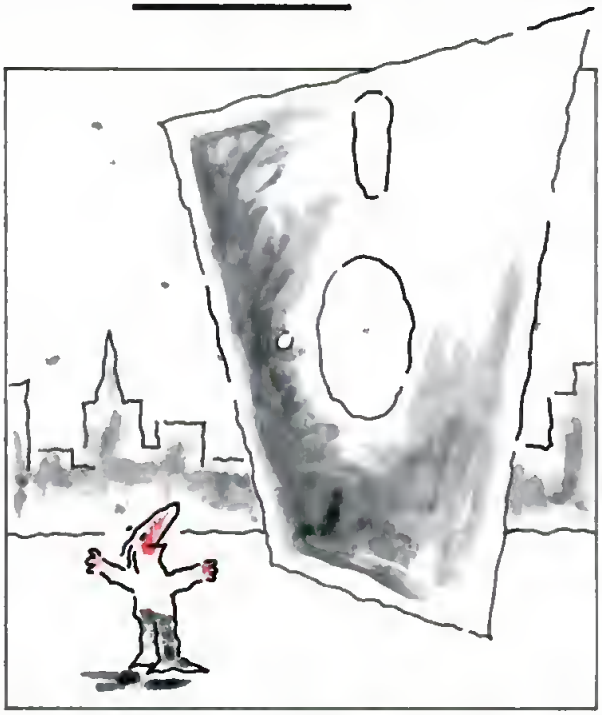
If the network companies are smart, they'll introduce personal network packs. Novell might introduce the Two-Pack for the corporate elite, those who have the clout and standing in the hierarchy to requisition an extra computer. Or 3Com could bring out the 3Pack for true power users, those who are able to persuade their information manager that they need to employ three computers simultaneously.

If this trend really takes hold, I'm willing to predict that we're on the verge of a new Golden Age of personal computers. PC

CIRCLE 301 ON READER SERVICE CARD

# ACCOUNTING SOFTWARE YOU'LL NEVER OUTGROW.

*A breakthrough in micro software power and flexibility means never having to replace your business accounting software again!*



We'd like to introduce you to micro software that will never become obsolete – Macola Financial Software.

**Get All the Power You'll Ever Need—Once and for All!** Macola Financial Software is adapted from minicomputer programs proven through a decade of successful applications.

It literally unleashes the power of a minicomputer for micro applications. That's the kind of power that encourages unlimited business growth.

**13 Different Program Modules.** Macola Financial Software offers up to 13 different modules that provide these vital operational functions:

**Accounting**—General Ledger – Accounts Receivable – Accounts Payable – Payroll – Fixed Assets/Depreciation

**Distribution**—Inventory Management – Customer Order Processing – Purchase Order and Receiving

**Manufacturing**—Bill of Material Processor – Material Requirements Planning* – Master Scheduling* – Job Costing*

Plus there's a Report Writer that permits customized reporting and has the ability to transport data files to popular spread sheet, word processing, and data base programs.

**Total Integration or Departmental Solutions—Your Choice!** Macola Financial Software is an integrated business solution for growth-oriented companies. You can begin with a single, stand-alone program and build an integrated system over time.

And when your business gains Fortune 1000 status, you can implement departmental computing with communications linked back to a mainframe.

*Under development, to be released

**Proven Network Compatibility.** Without question, this is the most advanced software compatible for Local Area Network (LAN) environments. Macola Financial Software has four years of actual field experience in LAN applications and already represents four generations of enhancements.

No other micro software can say the same.

It's easy to upgrade Macola Financial Software from a single- to multi-user system, requiring no change in program or data files. All of which means that, when your business is ready to move into LANs, your software will be ready, too.

**Speed and Data Integrity.** Macola Financial Software is written in Micro Focus COBOL for maximum speed and data integrity (source code available). Micro Focus features an efficient dual file structure that provides assurance against accidental loss of data.

**Software Constantly Updated.** The only "certainty" in computer software is that this morning's innovation will be replaced by this afternoon's. How do you protect against that?

With Macola Financial Software. It's constantly being enhanced, with new features that are designed specifically to solve actual field problems.

That's why it's software that is literally impossible to outgrow—because it never stops growing.

**Comprehensive Support.** When you purchase Macola software, you receive easy-to-understand documentation. Comprehensive technical support is available direct from Macola via a toll-free 800 line or through Macola's nationwide network of authorized resellers who provide local training and hands-on support.

Your support options also include source code modifications.

We're your technical partner for the life of your system. And that's a long, long time.

**By the Way, Who IS Macola?** We've been helping businesses find computing solutions since 1971. And we were one of the first companies to successfully introduce business application micro software specially programmed for LAN environments.

When you're investigating business accounting software, remember that now there is a standard for long-term value and performance. And "Running is believing."

For more information, or to order "live" demonstration programs:

**Call 1-800-468-0834**
**(Ohio) 1-800-468-0833**

MACOLA™
FINANCIAL SOFTWARE

*Because growing companies need powerful accounting.*

*See just how much this software can do – for* FREE!

*Please rush me your FREE brochure describing all the capabilities of Macola Financial Software.*

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

ZIP _____ PHONE _____

Check one: ☐ Dealer ☐ End User

Mail to: *Macola, Inc.*
*P.O. Box 485*
*Marion, Ohio 43302*
*(614) 382-5999*

CIRCLE 263 ON READER SERVICE CARD

# Before You Invest in a LAN, Take This SimpleNET™ Test.

Investing in a Local Area Network for your business can cost you a bundle, anywhere from $2,000 to $18,000 for a two and four PC system. And how can you be certain you're getting the most for your money?

What's the solution? Before you buy, test the speed that a file transfers from one PC to another. It's a benchmark of how well the hardware and software perform.

## Try The SimpleNET™ Test

Using two IBM®AT™ or compatibles, one as user, the other as server: 1) Load a 100,000 byte program onto a user from a server system, and 2) Copy a 500,000 byte text file from the user to the server's hard disk drive.

We recently put our SimpleNET system, as well our competitor's systems, to this rigorous test. You'll be amazed at the results.

In this head-to-head test, SimpleNET proved it has the best performance-to-price ratio of any other comparable LAN system. And when you consider SimpleNET's other remarkable advantages, there's really no contest.

## SimpleNET's Proven Versatility

Each PC on the SimpleNET network is simultaneously user and server, with full sharing of any and all resources connected to each PC. Printers, plotters, data and disk storage get full usage by your staff on the SimpleNET network. Every PC is equal and there is no central file server to act as "boss".

With a growing business, you can expand the network directly to 32 PC workstations without needing a repeater box. Full expansion can go to 256 PC's! And you can connect the PC's together in any convenient way. Remarkably, you'll find no slowdown in the speed of data transfer.

## You Don't Lose Data Because of Speed.

We've built in a sophisticated collision avoidance device (CSMA/CA) that detects potential collisions *before* data transmission, rather than after collision, as in many competitive products.

**THE SimpleNET LAN TEST*:**

| | 100,000 byte file transfer | 500,000 byte file transfer | Sugg. Ret. Price |
|---|---|---|---|
| **SimpleNET** | 15.2 sec. | 69.2 sec. | $695.00 |
| StarLAN | 42.1 sec. | 265.5 sec | $2,700.00 |
| NOVELL | 6.2 sec. | 30.7 sec. | $4,100.00 |
| Knowledge Network | 61.0 sec. | 291.4 sec. | $528.00 |
| EasyLAN | 121.0 sec. | 486.0 sec. | $638.00 |

*Typical four-PC user system configuration.

## SimpleWare™ Makes SimpleNET Unbeatable

SimpleWare™, the software supplied with SimpleNET, provides NETBIOS interface to your system. This means that all IBM PC and competibles can be run on any version of DOS 2.10 and up. Slightly less than 100 K bytes of RAM are needed for operation, one of the smallest network operating systems.

SimpleWare acts as a shell around standard DOS on each PC so that all network activity occurs as a background task. For example, you can be working on an application and still receive mail/messages, up to 15 seperate transmissions, without interruption. You can save, forward or print these messages by accessing the SimpleWare menu at any time.

You can put up to four printers plus a modem to the system. The print spooler can handle a maximum of 128 different print files. Now that's efficiency!

You can aiso password-protect your own files. Only those with the proper password can gain access to subdirectories.

## Two-Year Warranty Plus a 30-Day Money Back Guarantee.

We're so confident of the quality and reliability of our SimpleNET system that we will replace any defective part within two years from the date of purchase. And if for any reason you are not satisfied, we will refund your money in full within 30 days.

## Introductory Offer.

SimpleNET (basic four-user system) is only $695. Includes user modules, 50 ft. cabling and SimpleWare. Additional user interface module, only $99 each. Price includes unlimited customer phone support.

**To Order Call 1-800-262-8010**
(In CA Call 714-526-5151)

VISA, MeaterCerd and COD's eccapted. Dealer Inquiries Welcome.

## SimpleNET™ Systems

Division of BCSoft Corporation
3261 North Harbor Blvd, Suite B
Fullerton, CA 92635

All BCSoft products are trademarks or registered trademarks of BCSoft Corporation. Other brand and product names are trademarks or registered trademarks of their respective holders.

FREE DEMO!

# TAS-Books VS. Dac-Easy

| | DAC | TAS-Books |
|---|---|---|
| Full price including Payroll, G/L, A/R, A/P, Sales order/Invoicing/P/O/Inventory & Tutorial | $159.75 | $99 |
| Written using 4th generation language | NO | YES |
| Source code included/modifiable | NO | YES |
| Easy-to-change file structures | NO | YES |
| Report generator | NO | YES |
| Multi-user option available | NO | YES |
| On-line help messages | NO | YES |
| 3-yrs. GL data by month | NO | YES |
| Create mail/merge files | NO | YES |

## Order our free hands-on tutorial and see why TAS-Books wins hands-down.

### TAS-Books gives you more for your money.

Before you buy Dac-Easy accounting software (or if you already have), you should know what you could have instead.

You could have software that changes — easily — to fit your accounting system, instead of the other way around. You could have a program that includes payroll and a full-featured data base at no extra charge.

### TAS-Books adapts to fit your business.

Accounting systems are not all alike. That's why TAS-Books is written using the popular TAS-Plus 4th generation language/relational data base, with source code included. So you can easily customize TAS-Books to fit your business. Or you can have our Computer Services staff make modifications for you.*

### TAS-Books does so much, so easily.

TAS-Books gives you full audit trails and integrated modules, with sales and purchase histories updated automatically. You can review up to 3 years of GL data by month. Plus all the usual accounting functions. And you get a tutorial, and on-line help messages in each field.

**Here's what TAS-Books offers you:**

**General Ledger**
- 3 years of data by month
- Full audit trails
- Post to previous periods and reclose
- Budgeting by month
- Flexible financial statement setup/printing

**Accounts Receivable**
- Open item
- Mailing labels and rolodex cards
- Detailed history of sales, costs, and net
- Statements
- Agings

**Accounts Payable**
- Easy to enter invoices/vouchers
- Enter checks written by hand and/or print out checks automatically
- Mailing labels and rolodex cards
- History of purchases

**Payroll**
- Easy to run
- Produces all necessary information
- Prints W-2 forms
- Allows for employee reimbursement without tax

**Inventory**
- Averages cost and records last cost
- Adjusts physical quantity
- Uses fractional quantity
- Keeps track of non-inventoried items
- History of sales, cost, and net
- Adjust cost
- Each item can have its own SALES and COGS GL account

**Invoicing/Sales order**
- 99 items per order
- Description lines added easily
- Credits may be mixed on same order
- Discount for any line
- Ship to may be loaded from customer file

**Purchase order**
- 99 items per order
- Description lines added easily
- Credits may be mixed on same order
- Discount for any line
- May order non inventoried items

**Plus many reports and other features too numerous to mention!**

### Full-featured database gives you real versatility.

No need to buy an expensive data base to interface with TAS-Books: it's included at no extra charge! So you can easily generate customized reports and create mail-merge files. No need to preallocate files. TAS-Plus does all the hard work for you! And if you're already using DAC Easy, TAS-Books will translate your current files.

### Order today 1-800-648-6258.

Call our Toll-Free Hotline. Use your VISA, MasterCard or American Express to order today. For information or Washington residents call 1-206-644-2015.

TAS-Books is available for the IBM PC/XT/AT and fully compatible computers.

CIRCLE 472 ON READER SERVICE CARD

*This service is an additional charge

## Money-back guarantee!

Try TAS-Books for 30 days. If it's not exactly what you've been looking for in accounting software, just send it back. You'll get a full refund (less $15 handling fee).

## TAS+™

**NOT COPY-PROTECTED**

**Free Demo. . . Free Postage**

☐ We're not kidding. We're so sure you'll love TAS-Books we'll send you our Tutorial disk absolutely free of charge. We'll even pay the postage. Just check the box above.

☐ **YES!** I'm already sold. Send me powerful, user-friendly accounting software, with easy-to-customize coding and its own full-featured data base. And I want to save money over programs that offer me a lot less. Rush me TAS-Books now!

| Quantity | | Subtotal |
|---|---|---|
| _____ | @ $99 ea | _____ |
| | Shipping: $8 U.S., $25 outside U.S.A. | _____ |
| | WA residents add 8.1% sales tax | _____ |
| | TOTAL (U.S. funds only) | _____ |

Name _____

Company Name _____

Shipping address _____

_____

City _____

State _____ Zip _____

Telephone _____

Payment (circle one): VISA MC AMX Check

Credit Card Expiration Date _____

Card Number _____

Name on Card _____

**BUSINESS TOOLS INC.**

4038-B 128th Ave. S.E.
Suite 266
Bellevue, Washington 98006
(206) 644-2015

VISA MasterCard

The following are registered trademarks of these companies: TAS Plus, The Accounting Solution, TAS Books, Business Tools, Inc., IBM PC/XT/AT International Business Machines Corp., Dac Easy, Dac Software, Inc.

© 1987 Business Tools, Inc.

You're about to witness something amazing.

The Saba Handscan. A significant advance in data entry.

Faster than the fastest typist.

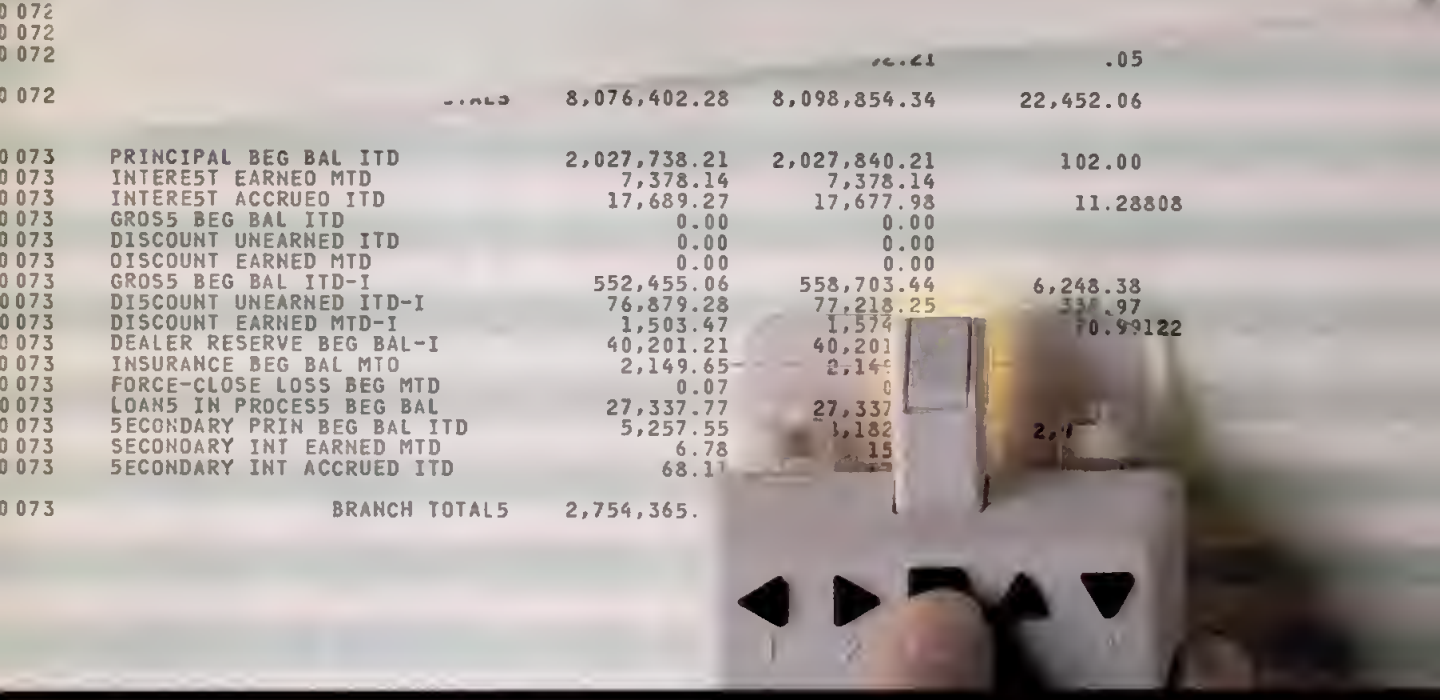
It actually reads most computer printouts. And typed sheets.

You select the information you need.

For less than $650, scan directly into Lotus 1-2-3. And other spreadsheets. Or, Handscan directly into word-processors, like WordStar. And right into data bases, like dBase and R:Base.

Contact your computer supplier and ask for a demonstration.

And witness the most significant productivity tool ever devised for IBM XTs, ATs and true compatables. Hands down.



| | | | | |
|---|---|---|---|---|
| 0 072 | | | [illegible] | .05 |
| 0 072 | | [illegible] | 8,098,854.34 | 22,452.06 |
| 0 073 | PRINCIPAL BEG BAL ITD | 2,027,738.21 | 2,027,840.21 | 102.00 |
| 0 073 | INTEREST EARNED MTD | 7,378.14 | 7,378.14 | |
| 0 073 | INTEREST ACCRUED ITD | 17,689.27 | 17,677.98 | 11.28808 |
| 0 073 | GROSS BEG BAL ITD | 0.00 | 0.00 | |
| 0 073 | DISCOUNT UNEARNED ITD | 0.00 | 0.00 | |
| 0 073 | DISCOUNT EARNED MTD | 0.00 | 0.00 | |
| 0 073 | GROSS BEG BAL ITD-I | 552,455.06 | 558,703.44 | 6,248.38 |
| 0 073 | DISCOUNT UNEARNED ITD-I | 76,879.28 | 77,218.25 | [illegible].97 |
| 0 073 | DISCOUNT EARNED MTD-I | 1,503.47 | 1,574 | [illegible]0.99122 |
| 0 073 | DEALER RESERVE BEG BAL-I | 40,201.21 | 40,201 | |
| 0 073 | INSURANCE BEG BAL MTD | 2,149.65 | 2,14[illegible] | |
| 0 073 | FORCE-CLOSE LOSS BEG MTD | 0.07 | 0 | |
| 0 073 | LOANS IN PROCESS BEG BAL | 27,337.77 | 27,337 | |
| 0 073 | SECONDARY PRIN BEG BAL ITD | 5,257.55 | [illegible],182 | 2,[illegible] |
| 0 073 | SECONDARY INT EARNED MTD | 6.78 | 15 | |
| 0 073 | SECONDARY INT ACCRUED ITD | 68.1[illegible] | [illegible] | |
| 0 073 | BRANCH TOTALS | 2,754,365. | | |

# Speed up data entry. Do it by hand.

In Oregon call (503) 641-8520. The following are registered trademarks: IBM XT and AT of International Business Machines Corporation; Lotus of Lotus Development Corporation, WordStar of MicroPro International Corporation.

copyrighted material

E16: [W16]
2149_

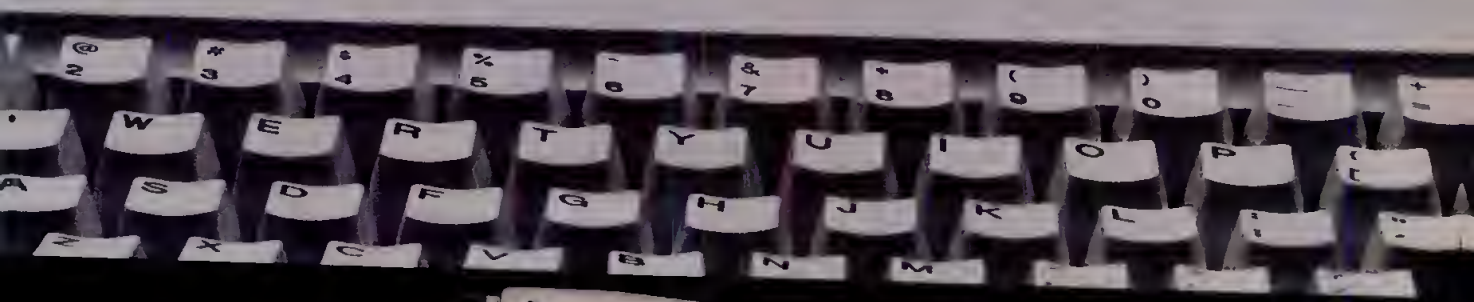
You're about to witness something amazing.

It actually reads most computer printouts. And typed sheets.

You select the information you need.

For less than $650, scan directly into Lotus 1-2-3.

| | | |
|---|---|---|
| PRINCIPAL BEG BAL ITD | 2027738.21 | 2027848.21 |
| INTEREST EARNED MTD | 7378.14 | 7378.14 |
| INSURANCE BEG BAL MTD | -2149.65 | |



Handscan™

Call for a demonstration (800) 654-5274.

saba™

Power tools for the office.™

dBase of Ashton Tate; R:Base of Microrim Incorporated; Saba and Handscan of Saba Technologies, Inc

CIRCLE 391 ON READER SERVICE CARD

# PLUGGING INTO PC

PC communications is a simple, three-part equation: you need a modem, you need communications software, and once you've got them working together, you need someone—or something—to call.

Of course, you have to choose from hundreds of modems, dozens of communications software packages, and scads of on-line services and e-mail options. That part isn't so simple.

This issue is designed to help you make hardware, software, and services choices that will make your telecommunications as efficient, economical, and powerful—maybe even as fun—as possible. It starts with the most comprehensive 1,200- and 2,400-bit-per-second modem survey we've ever done—over 80 products from more than 40 manufacturers, torture-tested in our PC Labs for line-noise resistance and other characteristics, then reviewed by a team of 14 writers who tell

# COMMUNICATIONS

you how the modems operate in real-world conditions.

Then it's on to on-line databases, featuring a survey of BRS, CompuServe, The Source, and nine other popular systems. We compare on-line charges, menu structures, and general accessibility, and we point out the highlights of each service.

Our coverage of electronic mail vendors includes a look at the big three public e-mail companies and a story on six e-mail systems designed to be used inside corporations.

In addition, we tell you about some favorite (and not-so-favorite) communications software, as well as review a bunch of packages that automate your telecom functions by working behind your main applications.

Hardware, software, services—everything you need to log on to the world of PC communications—is right here.

Illustration: Chris Spollen

# *The Modern Modem:* BRIDGE TO THE ON-LINE

*Some PC users consider modems to be simple, utilitarian devices, but they are, in fact, electronic marvels that have the power to extend the reach of a PC far beyond a desktop. Faster and smarter than ever, these unassuming boxes and boards can greatly enhance a PC's versatility.*

The modem seems like the most contrived computer accessory ever foisted on an otherwise astute segment of the buying public. Both your PC and your telephone deal in the same stuff—electrical signals—so you might expect that connecting them would be a job for a simple patch cord. Instead, you and your wallet must suffer the indignity of buying an innocuous-looking but expensive modem to tie them together.

Yet in many ways the modem modem is a miracle worker. For instance, the best modems are capable of squeezing more than a dozen data bits where only one should fit. Even the least expensive operate like specialized time machines that can bridge the century-wide chasm between computer and telephone technologies. The modem brings the world to your PC, allowing you to tap into nationwide data networks and interchange your best bytes with friends and accomplices. If you want to extend your digital reach beyond your PC's case and its floppy disk slot, you need a modem.

Far from being the hatchlings of some plot of the military/industrial complex—or some even more sinister force, like the telephone company—modems are a necessary bridge between digital and analog signals. The first pained words out of Dr. Bell's speaking telegraph were analog electrical signals—the same juice that flows through the receiver of your own telephone. Although, strictly speaking, digital communications are older (the conventional telegraph predates the telephone by nearly three decades: Samuel F. B. Morse wondered what God had wrought in 1844), current digital technology is only a recent phenomenon. The job of the modem is to accommodate today's digital pulses to a telephone network still firmly rooted in the 19th century. Like electrical goodwill ambassadors, modems help hostile signals get along together.

But the modern modem usually does much more than connect. Most are boxes chock-full of convenience features that can make using them fast, simple, and automatic. The best of today's modems not

# WORLD

only make and monitor the connection but even improve it. They dial the phone for you, even remembering the number you want and trying again and again until a connection is made. They listen in until they're sure of good contact, and only then let you transmit across the telephone line. Some even have built-in circuits to detect and correct the inevitable errors that creep into your electrical conversations.

**MODULATION IN ALL THINGS** No matter what the speed rating or the features packed in, all true modems share the same operating principle and serve the same purpose. By definition, the job of a modem is to convert digital data into modulated, audio-like signals that can be carried over telephone lines as if they were voice communications. The key word is modulation, which means modifying one signal with another in such a way that the resultant combination can transmit information that can be readily retrieved. The name *modem* itself is an abbreviation of MOdulator/DEModulator.

The original signal, the one that is modulated, is termed the carrier because it carries or bears the load of the modulating information. In most systems, the carrier is a steady-state signal of constant amplitude (strength) and frequency, and of coherent phase.

The modifying signal, usually simply termed the modulation, causes one or more aspects of the carrier to change in response to a change in the modulation itself—although not necessarily a change in the same aspect. For instance, in frequency modulation a change in the strength of the modulation is reflected as a change in the frequency of the carrier. Demodulation undoes this dastardly work and allows the original modifying signal to be reconstructed.

Modulation brings several benefits—more than enough to justify the complication of combining signals. Because electronic circuits can be tuned to accept the frequency of one carrier wave and reject others, multiple modulated signals can be sent through a single communications medium. This principle underlies all radio communication and broadcasting. In addition, modulation allows digital, direct-current-based information to be transmitted through a medium, like the telephone system, that otherwise could not carry direct current signals.

**TUNE-IN, TURN-ON** Communications signals have a characteristic called bandwidth, which specifies the range of frequencies they occupy. An unmodulated carrier wave has a nominal operating frequency—the number you dial in when you tune your radio, for instance. Without modulation, the carrier wave uses only that frequency. The modulation, however, contains information that varies at some rate. Music or voice signals may contain a near-random mix of frequencies between 20 and 20,000 Hz. A digital signal also has a characteristic frequency that corresponds

to its bit rate, as measured in units defined as bits per second.

In simple systems, when the carrier is modulated the resulting signal occupies twice the frequency space that the frequency range of the original modulation did. The carrier and modulation mix together, and this mixture results in modulation products corresponding to the frequency of the modulation *added* to the carrier, together with the frequency of the modulation *subtracted* from the carrier. These upper and lower modulation products are essentially redundant, so one or the other can be eliminated without loss of information. However, the fundamental fact remains that any modulated signal requires a finite range of frequencies to hold its information. The limits of this frequency range define the bandwidth required by the modulated signal.

As with signals, communications channels also have characteristic bandwidths that define the frequency limits of the signals that they can carry. This channel bandwidth may be physically or artificially limited. For instance, the bandwidths of radio transmissions are limited artificially—by law—to allow more differently modulated carriers to share the airwaves while preventing interference between them. In wire-based communications channels, bandwidth is often limited by the wires themselves. Certain physical characteristics of wires (such as inherent inductance and capacitance) cause degradations in their high-frequency transmission abilities. Amplifiers or repeaters, which are built into systems to boost signals so that they can travel longer distances, often cannot handle some of the very low frequencies.

Most telephone channels also have an artificial bandwidth limitation imposed by the telephone company. To get the most use out of a single pair of wires, the telephone company regularly limits the bandwidth of telephone signals and stacks them on top of one another through multiplexing techniques that allow a single pair of wires to carry hundreds of simultaneous conversations. The telephone company's multiplexing equipment works so well that you are generally unaware of all the manipulations made on the voice signals to squeeze them through the wires.

**FREQUENCY SQUEEZE** One of the consequences of telephone company signal manipulations is a severe limitation in the bandwidth of an ordinary telephone channel. Typically, a telephone channel will allow only frequencies between 300 and 3,000 Hz to pass freely.

The comparatively narrow bandwidth of the telephone channel limits the bandwidth of the modulated signal it can carry, which in turn limits the amount of digital information that can be squeezed down the phone line by a modem.

Some modem modems have built-in circuits to detect and correct the inevitable errors that creep into electrical conversations.

Simple math will reveal the harsh constraints faced by modem signals. A telephone channel typically has a bandwidth of 2,700 Hz (from 300 to 3,000 Hz). At most, a carrier wave at exactly the center of the telephone channel, 1,650 Hz, could vary at a data rate of 1,650 Hz, which would fill the entire bandwith while allowing no safety margins.

The quality of telephone lines varies greatly, particularly when long-distance connections are involved. Using the entire bandwidth that is theoretically available is ill advised because poor connections won't carry the nominal 300- to 3,000-Hz bandwidth. Before a connection is made, there is no means of determining the actual bandwidth that will be available. In addition, most PC-style dial-up modems operate in duplex mode. They use two carriers to simultaneously transmit and receive data. Using two carriers halves the bandwidth available to each. Guard bands—unused frequencies that isolate the frequencies that are actually used so as to prevent confusion between separate carriers or between carriers and the varying limit of the bandwidth—reduce the bandwidth available to each of the two modulated carriers even further. The practical bandwidth limit for modem communications over real telephone channels works out to about 2,400 Hz, or 1,200 Hz for each duplex channel.

In the most rudimentary modems, one bit of data causes one change of state in the carrier wave. For instance, a 300-bps modem causes the frequency of the carrier wave to change to indicate a digital 1 or 0—one frequency indicates a 1, another frequency indicates a 0.

This simple form of modulation, called frequency shift keying (FSK), harks back to the days when telegraph operators banged away on the keys: pressing down on the telegraph key caused the shift in frequency. Every change of frequency or state carried 1 bit of information. In such systems, one change of state per second—1 baud—exactly equals 1 bit per second.

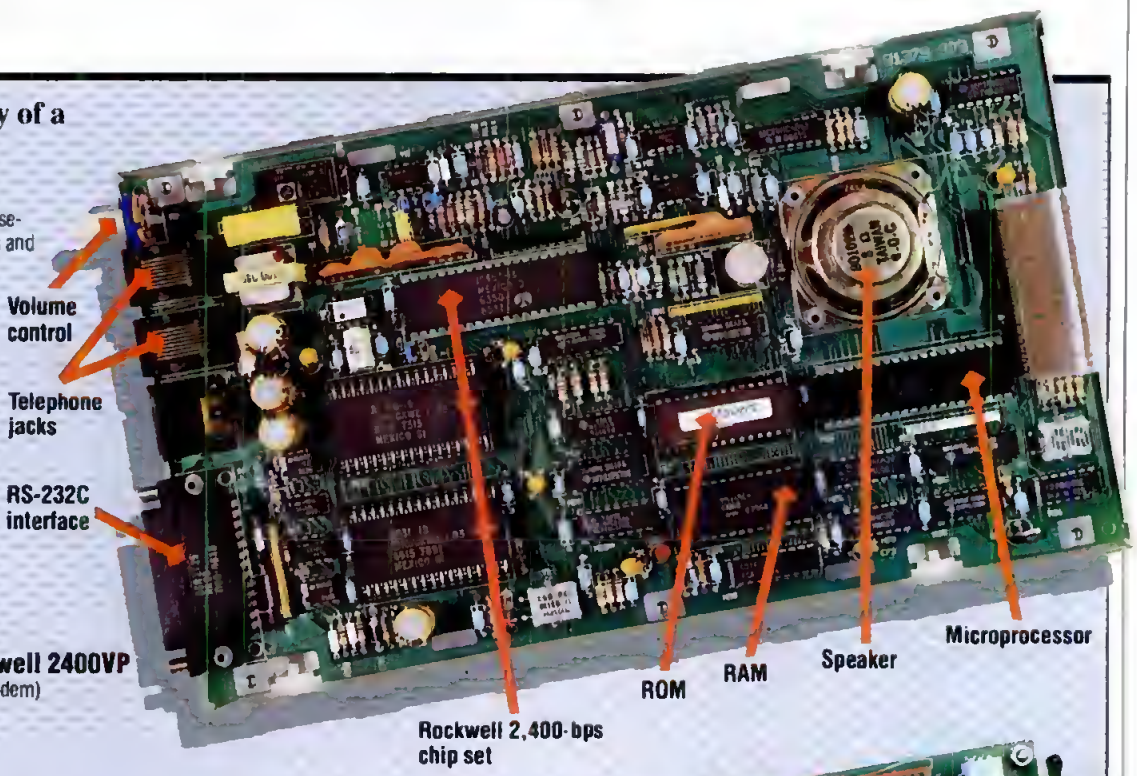
This 300-bps rate using the simple FSK technique requires a bandwidth of 600 Hz. The two 300-baud carriers (which require a 1,200-Hz bandwidth, for two times 600 Hz) and a wide guard band fit comfortably within the 2,400-Hz limit. Because the FSK modulation technique is relatively simple, 300-baud modems are generally inexpensive. Because they don't push out to the limits of the available bandwidth, they are generally reliable even with marginal connections.

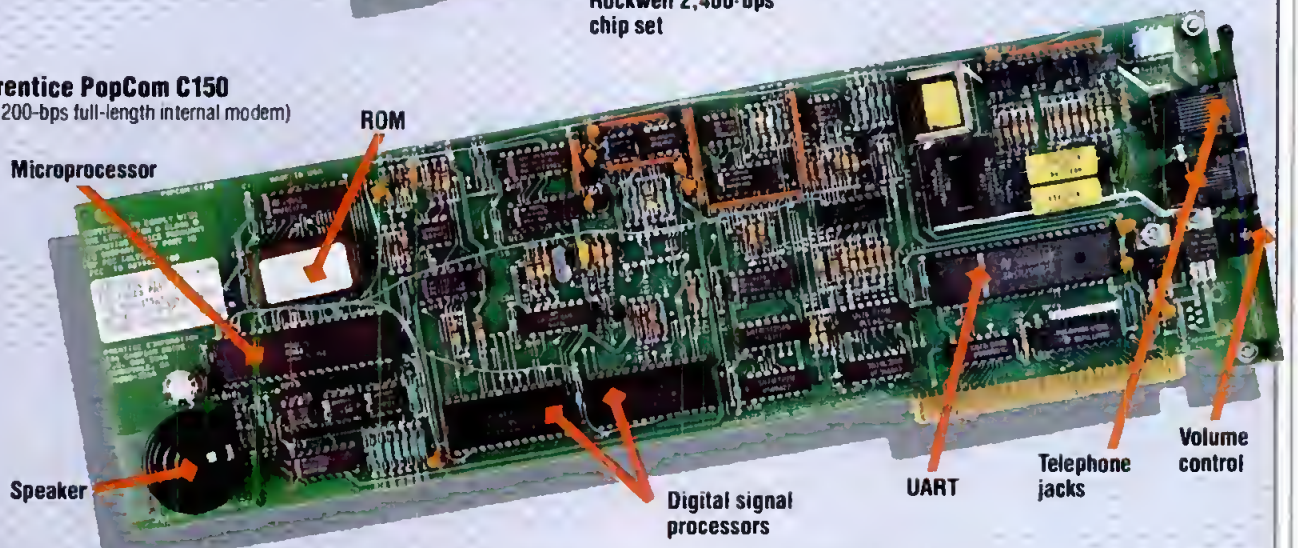
With the same simple modulation technique, modem speeds can be doubled to 600 baud. Beyond that, however, lies the immovable bandwidth roadblock.

**MULTIPLE MODULATIONS** Modern modems achieve higher data rates by using complex modulation methods. They may modify two aspects of the carrier wave rather than just one. For instance, today's 1,200- and 2,400-bps modems combine frequency and phase modulation. The altered form of modulation gains no bandwidth—remember, that's a function of the communications channel—but it gives the possibility of coding digital data as different states of the carrier wave. For instance,

## Anatomy of a Modem

An under-the-cover, close-up view of two modems and their vital parts




**RS-232C interface** Connects the modem to the PC's serial port. Not needed on internal modems since they connect directly to the PC's bus.

**Volume control** Not all modems have accessible volume control, and some have no provision for volume adjustment. A volume control knob that's accessible from outside the modem is convenient, especially in the case of an internal modem, in which inaccessible volume control means opening the PC case to make adjustments.

**Telephone jacks** Two phone jacks—one for the modem and one for the telephone—are desirable, but some modems have only one jack. A Y-connector attached to a single jack will provide an extra jack for the phone.

**UART** Stands for universal asynchronous receiver/transmitter. This chip converts the parallel signals from the PC's bus to serial signals needed for the telephone line. External modems don't require a UART chip because the signals are already in serial form, having passed through the serial port.

**Rockwell chip set** The most common 2,400-bps chip set, it controls most of the modem's functions.

**Digital signal processors** Perform the equivalent functions of a Rockwell chip set.

**RAM** Not always included on modems, extra RAM is used for buffers, phone directories, and on-board software.

**ROM** Contains instructions carried out by the microprocessor.

**Speaker** Provides audible feedback that lets the user know when the modem is dialing, when a connection has been made, and so on.

**Microprocessor** Controls dialing and other modem functions.

## 1200-bps Modems: Summary of Features

(Products listed in ascending price order)

The prices listed here are manufacturers' suggested retail prices. Actual "street" prices are often lower than list. Note that medium-price 2,400-bit-per-second modems are available for about the same price as high-end 1,200-bps models—a strong incentive to buy a higher-speed modem. Whether or not you use the high-speed mode of a 2,400-bps modem, you will still realize improved performance at 1,200 bps. All modems listed here operate at 300 bps as well as at the speeds shown on the table. In addition to the features listed, some models are equipped with built-in error correction (MNP or other error-correction protocols) and others offer it as an option; consult the modem reviews for details.

| | | | | Protocols Supported | | Setup | | | | | | | Hardware features | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | List price | Internal or external | Communications software included | Bell | CCITT | Through hardware or software | Full duplex | Half duplex | Auto-answer | Auto-dial | Auto-redial | Speaker volume control | Serial cable supplied | Transformer supplied | No. of phone jacks | Warranty |
| USTR Smartmodem 1200B | $ 99.00 | Internal | *ProComm* | 103, 212A | None | Both | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 1 year limited |
| THE 1200 Com Modem | $126.42 | External | *PC-Talk III* | 103, 212A | None | Hardware | ● | ● | ● | ● | ● | Hardware | ○ | ● | 1 | 1 year limited |
| Amazing Things Model A Series 1200B | $149.00 | Internal | *Bit Com* | 103, 212 | None | Both | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 1 | 2 years limited |
| Worthington-Babcock Turbolink 1200 | $149.00 | External | None | 103, 212A | None | Software | ● | ● | ● | ● | ● | Hardware | ○ | ● | 1 | 1 year, 60-day money-back guarantee |
| Leading Edge Model L Series 1200S | $149.95 | Internal | *Bit Com* | 103, 212A | None | Both | ● | ● | ● | ● | ○ | Hardware | N/A | N/A | 1 | 4 years limited |
| Novation 1200 XE Half Card | $159.00 | Internal | *ProComm* | 103, 113, 212A | V.21, V.22 | Both | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 2 years |
| Transend PCM1200 | $159.00 | Internal | None | 103, 113, 212A | V.22 bis | Hardware | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 2 years |
| Basic Time PC212A/1200 | $199.00 | Internal | *PC-Talk III* | 103, 212A | None | Hardware | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 1 year limited |
| Basic Time 212A/1200E | $199.00 | External | None | 103, 212A | None | Hardware | ● | ● | ● | ● | ● | Hardware | ○ | ● | 1 | 1 year limited |
| Zoom Modem 1200 ST | $199.00 | Internal | None | 103, 212A | V.22 | Hardware | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 2 years |
| Novation 1200 XE | $229.00 | External | *ProComm* | 103, 212A | V.21, V.22 | Both | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years |
| Tek-Com-212AD | $229.00 | External | None | 103, 212A | None | Software | ● | ● | ● | ● | ● | Software | ○ | ● | 1 | 1 year |
| Prometheus Pro-Modem 1200B/2 | $249.00 | Internal | *Mirror* | 103, 113, 212, 212A | V.21, V.22 | Both | ● | ● | ● | ● | ● | Both | N/A | N/A | 2 | 2 years |
| Prometheus Pro-Modem 1200B | $249.00 | External | None | 103, 113, 212, 212A | V.21, V.22 | Both | ● | ● | ● | ● | ● | Both | ○ | ○ | 2 | 1 year |
| EMP Automodem 1200HC | $250.00 | External | None | 103, 212A | None | Hardware | ● | ● | ● | ● | ● | Hardware | ○ | ● | 1 | 1 year |
| Migent Pocket Modem | $259.00 | External | *Bit Com* | 103, 212A | None | Software | ● | ● | ● | ● | ● | No speaker | ○ | ● | 2 | 1 year limited |
| Kyocera KM1200D | $265.00 | Internal | *Microsoft Access* | 103, 212A | None | Soth | ● | ● | ● | ● | ● | None | N/A | N/A | 2 | 2 years limited |
| Ven-Tel PC Modem Half-Card | $275.00 | Internal | *Crosstalk XVI* | 103, 113, 212A | None | Hardware | ● | ● | ● | ● | ○ | Software | N/A | N/A | 2 | 2 years, 5 years optional |
| Penril Cadet 1200 | $289.00 | External | None | 103, 212A | None | Hardware | ● | ● | ● | ● | ○ | Hardware | ○ | ● | 2 | 1 year limited |

PC—Indicates Editor's Choice ●—Yes ○—No N/A—Not applicable: internal modem

| | List price | Internal or external | Communications software included | Protocols Supported: Bell | Protocols Supported: CCITT | Setup: Through hardware or software | Setup: Full duplex | Setup: Halt duplex | Setup: Auto-answer | Setup: Auto-dial | Setup: Auto-redial | Setup: Speaker volume control | Hardware features: Serial cable supplied | Hardware features: Transformer supplied | Hardware features: No. of phone jacks | Warranty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Commodore Amiga Modem 1200 RS** | $295.00 | External | *ProCom* | 103 | None | Hardware | ● | ● | ● | ● | ● | None | ● | ● | 2 | 90 days repair/replace |
| **Kyocera KM1200S** | $295.00 | External | *Microsoft Access* | 103, 212A | None | Both | ● | ● | ● | ● | ● | None | ● | ● | 2 | 2 years limited |
| **OmniTel Encore 1200H8** | $299.00 | Internal | None | 103, 212A | None | Hardware | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 1 | 2 years limited |
| **OmniTel Encore 1200LC** | $299.00 | External | None | 103, 212A | None | Hardware | ● | ● | ● | ● | ● | Software | ○ | ● | 1 | 2 years limited |
| **SmarTEAM 1200AT** | $299.00 | External | *Quick Link* | 103, 212A | None | Hardware | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years |
| **Telecectics Pony-Express 12e** | $345.00 | External | None | 103, 212 | None | Software | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years |
| **Prometheus ProModem 1200** | $349.00 | External | None | 103, 113, 212, 212A | V.21, V.22 | Both | ● | ● | ● | ● | ● | Both | ○ | ● | 2 | 2 years |
| **Ven-Tel 1200 Plus** | $349.00 | External | None | 103, 212A | None | Hardware | ● | ● | ● | ● | ○ | Hardware | ○ | ● | 2 | 2 years, 5 years optional |
| **Quadrem Quadmodem QM2000** | $425.00 | Internal | *Crosstalk XVI* | 103, 212A | None | Both | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 2 years limited |
| **Prentice PopCom C150** | $445.00 | Internal | *PFS:Access* | 103, 212A | None | Both | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 5 years |
| **Telenetics Express-Dote 121/2** | $445.00 | Internal | *Relay or Crosstalk* | 103, 212 | None | Software | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 3 years |
| **OmniTel OmniPak** | $449.00 | Internal | None | 103, 212A | V.22 | Both | ● | ● | ● | ● | ● | Software | N/A | N/A | 1 | 2 years limited |
| **AT&T Model 4112** | $489.00 | Internal | *Softcall* | 103, 212A | None | Both | ● | ● | ● | ● | ○ | Hardware | N/A | N/A | 2 | 2 years limited |
| **Hayes Smartmodem 1200B** | $489.00 | Internal | *Smartcom II* | 103, 212A | V.22 | Both | ● | ● | ● | ● | ● | Software | N/A | N/A | 2 | 2 years limited, 2-year extension, $40 |
| **Code-A-Phone Tel-A-Modem** | $495.00 | External | *InstantComm* with background feature | 103, 212A | None | Hardware | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 90 days |
| **Visionary 1200** | $495.00 | External | None | 103, 212A | V.22 | Software | ● | ● | ● | ● | ● | Hardware | ● | ● | 2 | 1 year |
| **Netural Microsystems Watson** | $498.00 | External | *PC-Talk III* | 212 | None | Software | ● | ● | ● | ● | ● | Software | ● | ● | 2 | 1 year |
| **AT&T Model 4000** | $499.00 | External | None | 103, 212A | None | Software | ● | ● | ● | ● | ○ | None | ○ | ● | 2 | 2 years limited |
| **Prentice PopCom X150** | $499.00 | External | *PFS:Access* | 103, 212A | None | Both | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 5 years |
| **U.S. Robotics Courier 1200** | $499.00 | External | None | 103, 212A | V.22 | Both | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years limited |
| **Cermetek Security Modem** | $595.00 | External | None | 103, 212A | None | Both | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years |
| **Hayes Smartmodem 1200** | $599.00 | External | None | 103, 212A | V.22 | Both | ● | ● | ● | ● | ● | Software | ○ | ● | 2 | 2 years limited, 2-year extension, $40 |

## 2,400-bps Modems: Summary of Features

(Products listed in ascending price order)

| | List price | Internal or external | Communications software included | Protocols Supported: Bell | Protocols Supported: CCITT | Setup: Through hardware or software | Setup: Full duplex | Setup: Half duplex | Setup: Auto-answer | Setup: Auto-dial | Setup: Auto-redial | Setup: Speaker volume control | Hardware features: Serial cable supplied | Hardware features: Transformer supplied | Hardware features: No. of phone jacks | Warranty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **THE 2400 Com Modem** | $279.72 | External | *PC-Talk III* | 103, 212A | V.22 bis | Software | ● | ● | ● | ● | ● | Software | ○ | ● | 2 | 1 year limited |
| **Amazing Things Model A Series 2400B** | $209.00 | Internal | *Bit Com* | 103, 212 | None | Both | ● | ● | ● | ● | ● | Software | N/A | N/A | 1 | 2 years limited |
| **Leading Edge Model L Series 2400B** | $289.00 | Internal | *Bit Com* | 103, 212A | V.22 | Both | ● | ● | ● | ● | ○ | Software | N/A | N/A | 1 | 4 years limited |
| **PC's Limited PC 2400 B** | $200.00 | Internal | None | 103, 212A | V.22 | Both | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 2 years, 30-day money-back guarantee |
| **Traceend PCM2400** | $289.00 | Internal | None | 103, 113, 212A | V.22 bis | Hardware | ● | ● | ● | ● | ● | Software | N/A | N/A | 2 | 2 years |
| **Zoom Modem 2400 ST** | $319.00 | Internal | None | 103, 212A | V.22 | Hardware | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 2 years |
| **Basic Time 2400E** | $350.00 | External | None | 103, 212A | V.22, V.22B | Software | ● | ● | ● | ● | ● | None | ○ | ● | 2 | 1 year limited |
| **Basic Time 2400I** | $359.00 | Internal | *PC-Talk III* | 103, 212A | V.22, V.22B | Hardware | ● | ● | ● | ● | ● | None | N/A | N/A | 2 | 1 year limited |
| **Bytcom 24/12 ADH** | $380.95 | External | None | 103, 212A | V.22, V.22 bis | Software | ● | ● | ● | ● | ○ | Software | ○ | ● | 2 | 2 years |
| **Prometheus ProModem 2400G** | $399.00 | External | None | 103, 113, 212, 212A | V.21, V.22, V.22 bis | Both | ● | ● | ● | ● | ● | Both | ○ | ● | 2 | 1 year |
| **Cermetek 2400SPC** | $445.00 | Internal | *Mirror* | 103, 212, 212A | V.22 | Software | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 1 year |
| **OmniTel Encore 2400HB** | $449.00 | Internal | None | 103,212A | V.22 | Hardware | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 1 | 2 years limited |
| **Fraeklin FM-2400E** | $460.00 | External | None | 103, 212A | V.21, V.22B | Hardware | ● | ● | ● | ● | ● | Software | ○ | ● | 2 | 1 year limited |
| **Von-Tel Half-Card 24** | $475.00 | Internal | *Crosstalk XVI* | 103, 212A | V.22 | Hardware | ● | ● | ● | ● | ○ | Software | N/A | N/A | 2 | 2 years, 5 years optional |
| **Telenetics Pony-Express 24s** | $495.00 | External | None | 103,212A | V.22 | Software | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 3 years |
| **Prometheus ProModem 2400** | $499.00 | External | None | 103, 113, 212, 212A | V.21, V.22, V.22 bis | Both | ● | ● | ● | ● | ● | Both | ○ | ● | 2 | 2 years |
| **Penril Cadet 2400** | $535.00 | External | None | 103, 212A | V.22 bis | Both | ● | ● | ● | ● | ○ | None | ○ | ● | 2 | 1 year limited |
| **Telenetics Express-Data 2411/2** | $545.00 | Internal | *Relay or Crosstalk* | 103, 212A | V.22 | Software | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 3 years |
| **Black Box Dial Modem 24 Plus** | $540.00 | External | None | 103, 212A | V.22, V.22 bis | Both | ● | ● | ● | ● | ● | Software | ○ | ● | 2 | 1 year, 30-day money-back guarantee |
| **Novation 2400 Professional Half Card** | $540.00 | Internal | *Mite* | 103, 212A | V.22 bis | Both | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 2 years |
| **IBM 2400-bps Internal Modem** | $560.00 | Internal | None | 103, 212A | V.22 bis | Software | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 1 year |
| **Black Box Half-Card Modem 2400** | $505.00 | Internal | None | 103, 212A | V.22 | Hardware | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 1 year |
| **Fujitsu M1935D** | $505.00 | External | None | 212 | V.22 | Hardware | ● | ● | ● | ● | ● | Software | ○ | ● | 1 | 1 year |

—Indicates Editor's Choice ●—Yes ○—No N/A—Not applicable: internal modem *Also operates at 4,800, 7,200, 9,600, and 19,200 bps.

| | List price | Internal or external | Communications software included | Protocols Supported: Bell | Protocols Supported: CCITT | Setup: Through hardware or software | Setup: Full duplex | Setup: Half duplex | Setup: Auto-answer | Setup: Auto-dial | Setup: Auto-redial | Setup: Speaker volume control | Hardware features: Serial cable supplied | Hardware features: Transformer supplied | Hardware features: No. of phone jacks | Warranty |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Geodell Data Access Series SAM 24S** | $ 595.00 | External | None | 103, 212A | V.22, V.22 bis | Hardware | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years |
| **General DataComm Accellex 224** | $ 595.00 | External | *GDC (proprietary)* | 103, 113, 212, 212A | V.21, V.22, V.23, V.26, V.22A, V.22B | Software | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years |
| **Penril Datalink 2400** | $ 595.00 | External | None | 103, 212A | V.22B | Software | ● | ● | ● | ● | ○ | None | ○ | ● | 2 | 1 year limited |
| **Racal-Vadic Maxwell 2400VP** | $ 595.00 | External | None | 103, 212 | V.22B | Both | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years |
| **Multi-Tech MultiModem224EC** | $ 599.00 | Internal | *Multicom PC* | 103, 212A | V.22, V.22B | Both | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 2 years |
| **Prentice PopCom C250** | $ 599.00 | Internal | *PFS:Access* | 103, 212A | V.22 bis | Both | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 5 years |
| **SmarTEAM 2400** | $ 599.00 | External | *Quick Link* | 103, 212A, 224 | V.22A, V.22B, V.22 bis | Hardware | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years |
| **SmarTEAM 2400B** | $ 599.00 | Internal | *Quick Link* | 103, 212A, 224 | V.22A, V.22B, V.22 bis | Both | ● | ● | ● | ● | ● | Both | N/A | N/A | 2 | 2 years |
| **U.S. Robotics Courier 2400** | $ 599.00 | External | None | 103, 113, 212A | V.22 | Both | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years limited |
| **Ven-Tel 2400 Plus** | $ 599.00 | External | None | 103, 212A | V.22 | Hardware | ● | ● | ● | ● | ○ | Software | ○ | ● | 2 | 2 years, 5 years optional |
| **IDEAcomm 2400** | $ 645.00 | Internal | *IDEAcomm* | 103, 212A | V.22 bis | Software | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 1 year repair/replace |
| **Multi-Tech MultiModem224E** | $ 649.00 | External | None | 103, 212A | V.22, V.22 bis | Both | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years |
| **Telenetics Express-Data 24e** | $ 696.00 | External | None | 103, 212 | V.22 | Software | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 3 years |
| **Quadram Quadmodem QM2024** | $ 699.00 | Internal | *Crosstalk XVI* | 103, 212A | V.22 | Both | ● | ● | ● | ● | ● | Hardware | N/A | N/A | 2 | 2 years limited |
| **IBM 5842 Modem** | $ 719.00 | External | None | 103, 212A | V.22 bis | Hardware | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 1 year |
| **Hayes Smartmodem 2400B** | $ 739.00 | Internal | *Smartcom II* | 103, 212A | V.22 bis, V.22A, V.22B | Software | ● | ● | ● | ● | ● | Software | N/A | N/A | 2 | 2 years limited; 2-year extension, $75 |
| **AT&T Model 4024** | $ 750.00 | External | None | 103, 212A | V.22B | Both | ● | ● | ● | ● | ○ | Hardware | ○ | ● | 2 | 2 years limited |
| **Novation 2400 Professional** | $ 750.00 | External | *Mite (optional)* | 103, 212A | V.22 bis | Software | ● | ● | ● | ● | ● | Hardware | ○ | ● | 2 | 2 years |
| **Dowty Qantra V.22bis International Modem** | $ 780.00 | External | None | 103, 212A, 212S | V.21, V.22, V.23, V.22 bis | Software | ● | ● | ● | ● | ● | Software | ○ | ○ | 2 | 1 year |
| **Racal-Vadic 2400PA** | $ 795.00 | External | None | 103, 212 | V.22b | Software | ● | ● | ● | ● | ● | None | ○ | ● | 2 | 1 year |
| **Hayes Smartmodem 2400** | $ 899.00 | External | None | 103, 212A | V.22bis, V.22A, V.22B | Software | ● | ● | ● | ● | ● | Software | ○ | ● | 2 | 2 years limited, 2-year extension, $75 |
| **Fastcomm 2496T-8*** | $1,079.00 | Internal | *Qmodem* | 103, 212A | V.22 bis, V.29 | Software | ● | ● | ● | ● | ● | No speaker | N/A | N/A | 1 | 2 years limited |
| **Fastcomm 2496T*** | $1,099.00 | External | *Qmodem* | 103, 212A | V.22 bis, V.29 | Software | ● | ● | ● | ● | ● | Hardware | ○ | ● | 1 | 2 years limited |

the carrier wave can be phase-modulated so that it assumes one of four states: in quadrature modulation, each state differs from the unmodulated carrier wave by a phase angle of 0, 90, 180, or 270 degrees—while operating at 600 baud.

The four different phase states are sufficient to encode the four different patterns of 2 digital bits. Thus a quadrature-modulated 600-baud modem can communicate at a data rate of 1,200 bps. This modulation technique is used for most of today's 1,200-bps modems. Note that each state change (to which this article will append the unscientific name *blip* to distinguish it from a digital *bit*) that crosses the telephone line carries twice as much information as the bits that went into the modem.

More-complex methods of modulation allow higher modem speeds. Dial-up 4,800-bps modems are available.

Data rates of 2,400 bps can be achieved by using an even more complex modulation that yields 16 discrete states while still operating at 600 baud. Each state encodes one of the 16 different patterns of four digital bits. One blip on the telephone line carries the information of four bits going into the modem.

More-complex methods of modulation allow even higher modem speeds—dial-up 4,800-bps modems are already available. Most higher-speed modems—for instance, today's 9,600-bps products—get an extra boost by forgoing duplex transmission and alternate between sending and receiving.

According to the free lunch principle, this system of seemingly getting something for nothing using complex modulation must have a drawback. With high-speed modems, the problem is that the quality of the telephone line becomes increasingly critical as the data rate is increased. Moreover, as modem speeds get faster, each phone line blip carries more information, and a single error soon can have devastating effects.

Although a long-distance telephone connection may sound unchanging to your ear, its electrical characteristics vary by the moment. Everything from a wire swaying in the Wichita wind to the phone company's automatic rerouting of the call through Bangkok when the direct circuits fill up can change the amplitude, frequency, and phase response of the circuit. The modem then faces two challenges: not to interpret such changes as data, and to maintain the quality of the line at a high-enough standard to support its use for high-speed transmission.

Better higher-speed modems have built-in active equalizers that compensate for changes in the line. Some also have a fallback option: when a connection becomes too bad to support a high data rate, the modem automatically falls back to a lower rate that's less sensitive to the vagaries of the line.

**BUYING A MODEM** Selecting one modem from the hundreds of products currently available is no small task. However, it can be made more tractable by making four separate judgments about each particular modem's performance, compatibility, features, and price.

Over a perfect telephone line, nearly all modems function perfectly—without errors. However, perfect telephone lines are impossible to find, and even getting an acceptable one nowadays seems to require bribing an operator. The performance differences between modems emerge as line quality goes down. Better modems are better able to cope with bad connections. They work with worse circuits and can pull data through with fewer errors.

One of the critical parameters of the

## THE EVER-WIDENING CIRCLE

*The term "modem" encompasses more than just the familiar 300/1,200/2,400-bit-per-second units.*

Among the PC community the term *modem* refers to a specific kind of box that links the computer and telephone line, a special device called the dial-up modem, which communicates digital data at from 300 to 2,400 bits per second. But there are several other devices that wear the moniker modem, too.

Some, like the inexpensive short-haul modems advertised for stretching the link between your PC and serial printer, aren't really modems at all. Short-haul modems involve minimal circuitry, often hidden inside the shell of a cable connector, and merely convert the digital output of a computer to another digital form that can better withstand the rigors of 1,000 feet of wire.

At the other end of the price and performance spectrum are dedicated and true high-speed modems that can zip information across the country at rates of 9,600 bits per second and higher. The dedicated products are meant for leased lines, which are special circuits set up by the telephone company (or other communications common carrier) especially for computer signals. They usually lack the dialing and answering features of dial-up modems and are meant for continuous connections.

True high-speed modems operate at data rates in excess of 4,800 bps. Although they may incorporate dial-up abilities, these high-speed modems are not yet popular among PC users because so few are in use, even by data service companies. Moreover, at really high data rates, 9,600 bps and beyond, standardization remains an unresolved issue. Unless you plan to equip both ends of your connections with matching products, true high-speed territory is still the promised land.—**Winn L. Rosch**

# STB's Chauffeur HT will drive your Lotus where Hercules can't go.

## Get full Hercules compatibility and the first 1056 x 352 resolution.

With STB's Chauffeur HT™, you can run software compatible with the Hercules Graphics Card™ on any IBM® compatible computer.

You get stunning monochrome graphics and high resolution text.

How does that make your life easier? Simple.

When you run a Lotus™ spreadsheet, you can view up to 65% more data on the screen at one time. All 12 months plus the totals column, in full 10 character columns!

If you use Hercules or IBM adapters, you have to pan to see that much data, wasting keystrokes and valuable time. But that's just the beginning.

When you use Microsoft Windows™ with the Chauffeur HT, you can display one application on the first two thirds of the screen, leaving the other one third for additional applications.

That's how Windows was intended to work.

Whether you want to get more mileage out of your Lotus or open more windows in monochrome graphics, only one video adapter goes the distance. The Chauffeur HT.

Contact your local dealer and ask for STB's Chauffeur HT, or any of STB's full line of video, memory and I/O boards.

*Simply The Best*

STB Systems, Inc.

1651 N. Glenville, Suite 210, Richardson, Texas 75081, (214) 234-8750

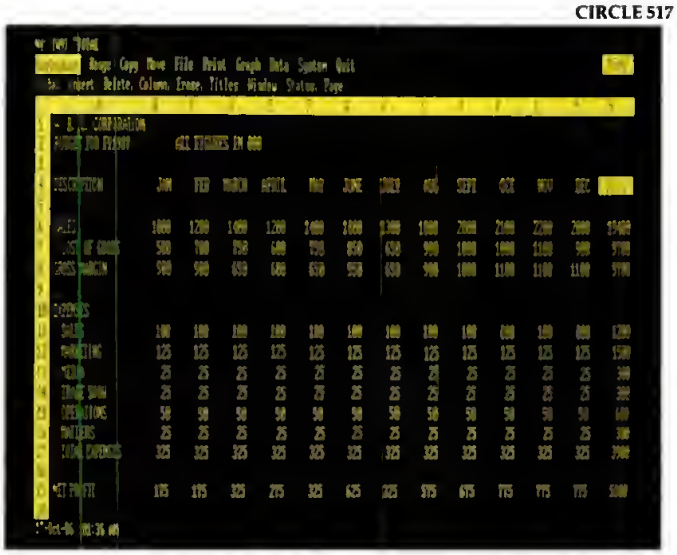
**CIRCLE 517 ON READER SERVICE CARD**

**Full Hercules Compatibility.**
- Runs Hercules Graphics Card software

**132 Character Display.**
- Perfect for Lotus 1-2-3™
- View 65% more data on screen than Hercules or IBM
- 8 x 14 character cell (over twice the character resolution previously available on any 132 character mode)

**High Resolution Monochrome Graphics.**
- 1056 x 352 bit mapped graphics, compared to 720 x 348 for Hercules
- 46% more than Hercules Graphics Card

**More Space for Windows.**
- 1056 x 352 bit mapped resolution
- Almost 50% more than Hercules Graphics Card



**ACTUAL SCREEN showing all 12 months and the totals column of a Lotus spreadsheet *at one time.* Note the sharpness of the 8 x 14 character cell produced by STB's Chauffeur HT.**

**Terminal Emulation.**
- First high resolution 132 character display
- Display full reports on screen
- Crisp 8 x 14 character cell

**Drivers for Lotus 1-2-3, Microsoft Windows, Symphony™ and AutoCAD™**

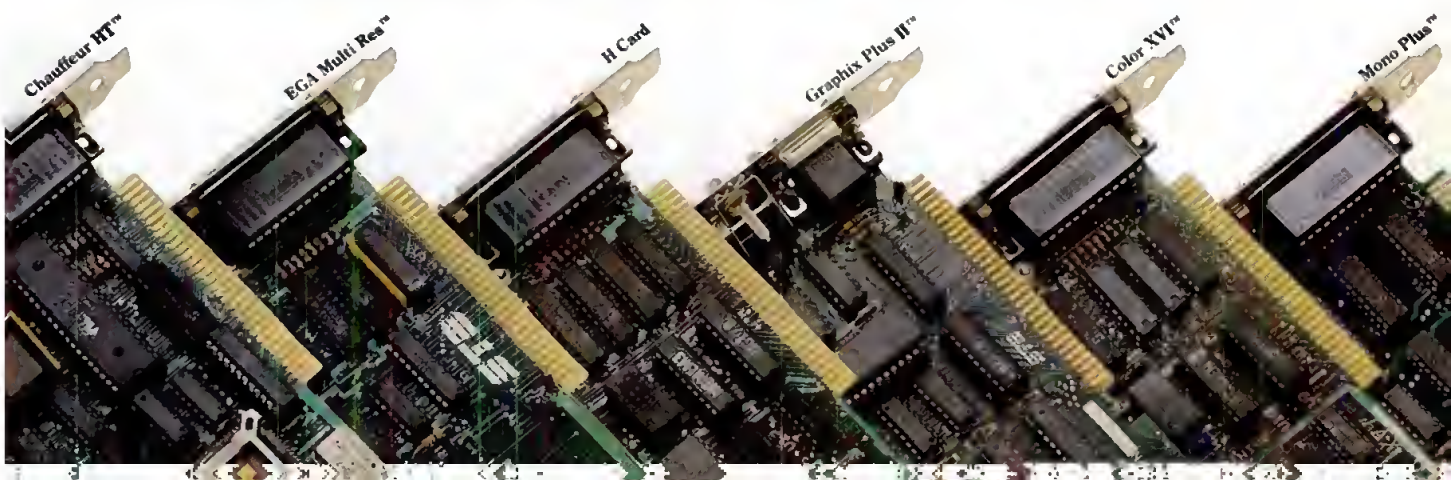
**Full I/O Capabilities.**
- Standard parallel printer port
- Optional clock/calendar
- Optional serial port

**PC Accelerator™ Software.**

**STB Two-Year Warranty.**

**IBM PC/XT/AT Compatible.**

*STB, Chauffeur HT are trademarks of STB Systems, Inc. IBM registered trademark of International Business Machines Corp. Hercules and Hercules Graphics Card registered trademarks of Hercules Computer Technology. PC Accelerator trademark of RESICORP. Lotus, Lotus 1-2-3, Symphony trademarks of Lotus Development Corp. Microsoft trademark of Microsoft Corporation. AutoCAD trademark of Autodesk, Inc.*



telephone line is the amount of noise it contains in relation to the strength of the signal it carries. This relationship is usually termed the signal-to-noise ratio of the line. The higher this ratio is, the better the connection.

The signal-to-noise ratio is often expressed in decibels (1/10 of a measurement unit called the bel, which is named after Alexander Graham Bell, by the way), which form a logarithmic measurement scheme—that is, a signal-to-noise ratio that is twice as good will only appear to be three decibels better.

PC Labs tested modems by simulating a poor connection and finding the smallest signal-to-noise ratio at which the modem would operate satisfactorily. Better signal-to-noise ratios indicate better, more-reliable modems.

The compatibility of a modem refers to software, and not its hardware connection. Controlling all the features of an advanced dial-up modem requires that commands be sent to it from the computer that it is connected to. These commands are usually sent invisibly by the communications program that is actually in control. Modems that are more compatible recognize the commands of a wider range of software packages.

Obviously, to be useful communications software must know the commands that the modem recognizes. Some communications programs let you define the modem commands yourself (usually during the installation process), and in theory will work with any modem. However, most communications programs are designed to accept one or more standard sets of commands.

In dial-up modems, no command set has received official sanction as the one and only standard. Most modems today, however, follow a de facto standard, the Hayes, or AT, command set. Originally developed by Hayes Microcomputer Products and used in the company's line of Smartmodems, the popularity of the hardware led to many software companies incorporating the commands in their products. Newer modems are adapted to accept the existing software, resulting in an acceptance of the standard. A modem that recognizes the Hayes command set will therefore work with the widest variety of software. Hayes-compatible modems are thus more versatile.

Note, however, that the Hayes standard is not immutable. As new modem features and capabilities are developed, the command set becomes richer. Moreover, varying degrees of Hayes compatibility exist. Some modems recognize only the most rudimentary of commands—for instance, using ATDT to initial the dialing sequence. Others more elaborately mimic the operation of Hayes products and incorporate the same registers as used by Smartmodems, which permit, for instance, setting the number of rings required before the modem answers.

Unless you have masochistic tendencies or software that is specifically designed for another modem command set, the safe bet is selecting a modem that's as Hayes compatible as possible.

Our tests show that most of the 2,400-bps modems, while lackluster at the higher rate, turned in great results when running at 1,200 bps.

The broad term *features* describes all the other differences between modems. For the most part, the features of a modem determine how easily and conveniently it can be used. A no-frills modem requires that you dial or answer the telephone manually and physically connect the modem to it at the appropriate time—for instance, when you hear the carrier tone of the modem at the other end of the line.

Although dialing the telephone manually is not an especially arduous chore for most people, a no-frills modem shortchanges the capabilities of your computer. With a full-featured modem, your PC can dial the phone faster and with fewer errors and can handle the chore automatically when you're not around. Or with the latest memory-resident communications software, your PC can dial the full-featured modem and collect your messages while you're in the midst of browbeating data into shape with another program.

## INTERNAL VERSUS EXTERNAL

When considering features, you also face the choice of internal or external modem versions. Physical appeal may be the best guiding factor, because often exactly the same circuitry is available in the different packages. There are other considerations that might lead you to prefer one style to the other, however.

External modems offer the advantage of portability: you can move external modems between different systems, even those that are not IBM compatible. Internal modems are bothersome to transfer between systems and their use is restricted to full-sized PCs, XTs, ATs, and hardware compatibles. Internal modems tend to be a few dollars cheaper because they don't need extra packaging or power supplies (although they do need some extra signal circuitry).

Despite the differences in packaging, most of the other impacts on the host system are the same with either an internal or external modem. In most cases, you'll still need to devote a COM port to your modem, and, except with some compatibles with ports on their system boards, you'll still give up an expansion slot for the modem connection. (Note that some internal modems can be set as COM3 or COM4, in effect giving your system an extra serial port, but not all software can control the ports beyond COM2.) In most cases, you'll want to choose an external modem for its flexibility; an internal modem for its neatness and lower cost.

Although 9,600-bps modems are starting to appear more regularly, most of the activity in the market centers around 1,200- and 2,400-bps models. The extra speed of 2,400-bps communications can be a boon, but error-free transmission at this rate is still a long way off, as our test results of 2,400-bps modems communicating at 2,400 bps show.

Ironically, the best reason to buy a 2,400-bps modem may be for its perfor-

# End your backup nightmares.

## With CORE*fast*™ backup software.

The consequences suffered by not properly backing up your data can be horrifying. Hours upon hours of collected data: lost or destroyed due to natural (or unnatural) disasters, crashed disk drives, or poor performing backup systems.

Our new diskette backup system CORE*fast*™, with its new and improved menu, enables you to backup an entire disk with only 5 keystrokes. The exclusive catalog feature allows you the flexibility to backup single files, complete or partial directories, or single files from multiple directories. And because it's a product of CORE, you're assured the highest level of quality possible. The same high standards we've set for disk drive performance, are now available in our software backup CORE*fast*™.

New CORE*fast*™ features—

- Backs up an entire disk using only 5 keystrokes.
- Allow you to fill a 360KB floppy in 17 seconds *or* a 1.2MB floppy in only 28 seconds *(a full 10MB in only 8 minutes).*
- Include advanced error checking to protect data against damaged floppies and accidental loss.
- Let you operate from a command line or easy-to-use menu.
- Enable you to backup Novell Netware *(even hidden files).*
- Can backup on any DOS device *(diskette, hard disk, tape, removables, etc.).*

List price...$149.00 with quantity discounts available. Contact us direct or see your CORE Authorized Dealer for details.

CORE INTERNATIONAL

7171 North Federal Highway
Boca Raton, Florida 33431
305/997-6055

Novell Netware is a registered trademark of the Novell Corporation.

CIRCLE 225 ON READER SERVICE CARD

# SPEAKING THE LANGUAGE OF MODEMS

*Most of the terminology used to describe modems comes from communications or electronics. Here is a glossary of the most frequently used terms.*

**Acoustic coupler** Links together a modem and a standard desktop telephone by sound waves rather than by an electrical connection. An acoustic coupler converts the tone-like analog signals made by the modem into sounds that are picked up by the microphone in the telephone handset and passed through the telephone network again as electrical signals. A microphone in the acoustic coupler picks up the sounds emanating from the earpiece loudspeaker of the handset, converts them to analog electrical signals, and supplies them to the modem.

Acoustic couplers can take many forms. Usually, the coupler consists of two rubber cups that engulf the mouthpiece and earpiece of a telephone handset. The cups can be separately attached to transmission wires or may be part of a single assembly.

Acoustic couplers were devised before the now-common modular telephone plug-and-jack arrangement was developed and before telephone company regulations permitted individuals to connect modems directly to their telephone lines. Acoustic couplers persist because they can be readily connected and disconnected from nonmodular telephones that have no direct access to the system wiring—for instance, pay station and older hotel room telephones.

**Analog** Describes an electrical signal or a system in which variations in amplitude (strength) or frequency correspond directly to the physical qualities of the information that the system contains. The intensity of the electrical signal is analogous to some physical quality of the information, hence the name. For instance, in an analog voice (telephone) signal, a higher voltage represents a louder sound.

Because any change in the signal changes the information that an analog signal contains, and because many kinds of interference can add extraneous voltages to such signals, analog technologies are subject to noise and degradation.

On the other hand, since the conversion of physical properties, like loudness, into electricity can be accomplished directly by using relatively simple transducers, analog signals are usually easy to create, and the information they contain can be regenerated fairly easily, simplifying circuit designs.

**Asynchronous transmission** Usually short for asynchronous data communication: a method of exchanging information between two computer systems that operate completely independently of each other and do not share any timing information.

Normally, the time at which a pulse occurs in relation to the ticking of a computer's system clock determines the meaning of a bit in a digital signal, and the pulses must be synchronized to the clock for proper operation. The digital pulses of the asynchronous signal are not locked to the system clock of either computer. Instead, the meaning of each bit of a digital word is defined by its position in reference to a clearly (and unambiguously) defined start bit. Each word of an asynchronous signal is self-contained and essentially independent of any time relations beyond its self-defined bounds.

Modem signals that travel over the telephone system are generally asynchronous. It is more expensive and difficult to synchronize signals through the telephone system because they may be rerouted at any time without any warning.

**AT command set** A de facto industry standard group of modem commands, each of which must be preceded by a two-letter attention command, AT. Same as Hayes command set, below. For example, to command a Hayes or Hayes-compatible modem to dial information on a tone-dialing line, the proper command would be ATDT15551212. The AT is the attention signal, D tells the modem to dial, T tells it to use tones for dialing, and the 15551212 is the number of the telephone company information service.

**Auto-answer** Describes a modem capable of detecting incoming ringing voltage (the low-frequency, high-voltage signal that makes the bell on a telephone ring) and seizing the telephone line as if it had been answered by a person. Upon seizing the phone line, the modem sends a signal to its host computer to the effect that it has answered the phone. The computer then can interact with the caller.

An auto-answer modem allows you or others to call into your computer system without anyone being present to answer the telephone and make the connection to your computer.

**Auto-dial** Describes a modem capable of generating pulse-dial or DTMF (dual-tone modulated frequency, or Touch-Tone) dialing signals independent of a telephone set.

An auto-dial modem can dial the telephone under computer command—for instance, after hours, when you're asleep and the phone rates are low. Without auto-dial, you would have to dial the phone yourself, connect the modem, then hang up.

**Baud** A measurement standard that describes how often a signal in a communications channel makes a transition between states (for instance, between different voltage levels, frequencies, or phase angles). Depending on the number of states used in the communications system, a single transition can convey less than or more than 1 bit of information. For instance, several different frequencies of tones might be used to code information. Hence, strictly speaking, 1 baud

is *not* the same as 1 bit per second, although the terms are often—and incorrectly—used interchangeably.

The square root of the number of available states (tones, voltage, or phases) is equal to the number of bits that can be coded by baud. For instance, most 1,200-bps modems operate at 600 baud with four different states available. Most 2,400-bps modems operate at 600 baud with 16 different states.

The term was named after J.M.E. Baudot, a French telegraphy expert. His name is also used to describe a 5-bit digital code used in teletype systems.

**Bell compatibility** Describes a modem that follows telephone company (generally AT&T) standards for a specific communications rate—for instance, Bell 103 for 300-bps operation and the Bell 212A standard for 1,200-bps operation.

Other standards exist, so compliance with these Bell standards is not necessary for successful operation on the telephone system. However, the modems at both ends of the connection must recognize the same standards if they are to communicate.

**Bit** An abbreviation for *BInary digiT*—the smallest unambiguous piece of digital information. One bit conveys the state of exactly one item. Patterns of multiple bits can represent words, symbols, and ideas; they are the basis for the communication and storage of digital information.

Although a bit is actually an idea and not a physical entity, a bit may be represented as a physical entity such as a digital pulse of electricity, the position of a switch, or a certain pattern of states in modem communications.

**Bits per second (bps)** A measure of communications speed, it refers to the number of bits that can pass through a communications channel in 1 second. The greater the number of bits per second, the faster information can be transferred.

Note that in asynchronous communication, the number of bytes (characters) transferred in 1 second is equal to about 1/10 the bit-per-second speed of the system. This is because 1 start bit and (usually) 1 stop bit are added to the information-bearing 8 bits of the byte.

**CCITT compatibility** Describes a modem that meets one or more of the standards created by the CCITT (an international telecommunications standards committee). Most often today this term describes a modem that follows the CCITT V.22 standard for a data rate of 2,400 bps. At higher speeds, other CCITT standards are gaining popularity.

In theory, the adoption of the CCITT standard is good news for people who want to communicate overseas (where the Bell standards may be illegal). The principal value of the CCITT standard is, however, that many manufacturers are taking them to heart and designing products to match, increasing compatibility and eliminating marketplace confusion.

**DCE (data communications equipment)** A term that defines the way the various pins on a standard 25-pin RS-232 serial port are used. Specifically, pin 3 transmits data and pin 2 receives it.

DCE devices plug directly (with an ordinary straight-through cable) into DTE devices (see below); attaching one DCE device to another DCE device requires a null modem or crossover cable.

Most external modems are customarily configured as DCE; the standard IBM asynchronous communications adapter operates as DTE.

**DTE (data terminal equipment)** A term that defines the way the various pins on a standard 25-pin RS-232 serial port are used. Specifically, pin 2 transmits data and pin 3 receives it.

DTE devices plug directly (with an ordinary straight-through cable) into DCE devices; attaching one DTE device to another DTE device requires a null modem or crossover cable.

The standard IBM asynchronous communications adapter is configured as DTE; most modems operate as DCE.

**Digital** Describes a type of electrical signal and the related technology in which information is coded as a series of pulses or transitions. The pattern of a series of pulses can have meaning in itself (for instance, a number), or it can encode a physical quantity such as the instantaneous intensity of an analog signal.

Digital designs are most often used in computer circuits because the digital pulses assume one of two values or states (usually a high or low voltage) that can be rapidly manipulated using the rules of Boolean logic to give discrete, unambiguous answers.

Because the pattern and not the strength of the pulses or transitions determines the information content, digital signals are relatively immune to noise (compared to anolog signals). Thus digital signals are also often used for critical, long-distance communications (for instance, transmissions from interplanetary probes).

Most of today's telephone and other communications systems remain analog because complex circuitry is usually required to digitize information. However, as technology improves and the costs of digitizing circuitry goes down, communications systems are certain to become increasingly digital in nature.

**Duplex** Describes the ability of a communications channel to simultaneously handle two signals, usually (but not necessarily) going in opposite directions. A full-duplex modem can send and receive information at the same time. A half-duplex modem alternately sends and receives signals.

The same term is often, and mistakenly, used to describe echoplex operation. In echoplex mode, a modem sends a character down the phone line, and the distant modem returns the same character—echoing it. The echoed character is then displayed on the originating terminal as confirmation that the character was sent correctly. Without echoplex, the host computer usually writes the transmitted character directly to its monitor screen.

**Error-checking protocol** Generally used to describe a scheme designed to detect errors in set-length groups of characters, called "blocks," which are trans-

*(continues)*

*("Speaking the Language of Modems" continued)*

mitted through digital systems.

Each block is made up of a predetermined number of bytes. For error checking (or error detection), the bytes are summed and a value representing the sum is transmitted along with the block of data. At the receiving end, the bytes in the block are again summed and compared with the transmitted sum; any difference reflects an error that ordinarily requires retransmission.

Many different error-checking protocols are used. The simplest and most common in PC communications is Xmodem, developed by Ward Christensen, though MNP (Microcom network protocol) is gaining popularity. For communication between different systems, Kermit, developed at Columbia University, is becoming widespread.

In general, the more rigorously a protocol protects against errors, the more slowly it works. Both ends of a communications channel must be equipped to handle the same error-checking protocol (or lack of one) for successful communications to be established.

**Hayes command set** A standard group of modem commands originally developed by Hayes Microcomputer Products but now used by the majority of the modem industry as a de facto standard.

Most of the Hayes commands begin with the two-letter attention signal, AT. The next character, or group of characters, defines the precise nature of the command sent to the modem.

For example, the command to immediately seize (answer) the telephone line is ATA—that is, the AT attention signal followed by the answer command itself, which is A.

**Hayes compatibility** The degree of Hayes compatibility in modems varies from a minimal ability to recognize the Hayes command set (see above) to a complete emulation of all the various modes and idiosyncrasies of Hayes modems. The most Hayes compatible modems are those made by Hayes Microcomputer Products.

**Kermit** See error-checking protocol.

**MNP (Microcom network protocol)** See error-checking protocol.

**Modem** The mediator of communications between a computer and the telephone network. The term is a foreshortening of the words MOdulator/DEModulator, which accurately, if obscurely, define the function of a modem.

The modulation process converts the digital, direct-current pulses used by the computer system into an analog signal containing the same information. This analog signal can then be transmitted through the voice-only channels of the telephone system. Demodulation reverses the process.

Modulation, and hence modems, are necessary because normal telephone connections will not allow digital, direct-current signals to pass freely—or at all.

**Null modem** A null modem is nothing more than an adapter cable that permits two serial devices that both function as DTE or as DCE to communicate with each other.

Sometimes called a crossover cable, the null modem crosses the wires connected to pins 2 and 3 at either end of the cable and, if hardware handshaking is used, other pins as well.

**Parity checking** A byte-level error-detection scheme that can identify the erroneous transmission of a single data bit through an asynchronous communications channel.

The *parity bit* is a part of the transmitted word of data. Its value is determined by summing the other data bits. In even parity systems, the parity bit assumes the value necessary for making the sum of all the bits even; in odd parity, the bit sum is always odd.

*Mark parity* means that the bit that would normally code parity information is always a digital one; *space parity* means the parity bit is always a zero. As you would expect, *no parity* means that no parity bit is used.

**Start bit** As the name implies, a start bit is the first bit in an asynchronously transmitted digital word. Unlike data bits, which may be either digitally on or off, the start bit is always on. Its function is to warn the receiving system that data bits will follow so that the receiving system is ready to process them.

**Stop bit** The last bit, or sometimes bits, in a digital word that is asynchronously transmitted. As with the start bit, the stop bit is always digitally on, and it simply defines the end of the word of data. Together the start and stop bits frame the word of digital information.

**Synchronous transmission** Data transmission during which the two ends of the channel share a common time base. The communicating devices operate continuously at substantially the same frequency and are maintained in the correct phase relationship by constantly monitoring and adjusting for the circuit conditions.

Unlike in asynchronous transmission, in synchronous transmission the timing of each bit independently is vital, but framing bits (start and stop bits) are unnecessary. Higher-speed modems (2,400 bps and beyond) often use synchronous transmissions.

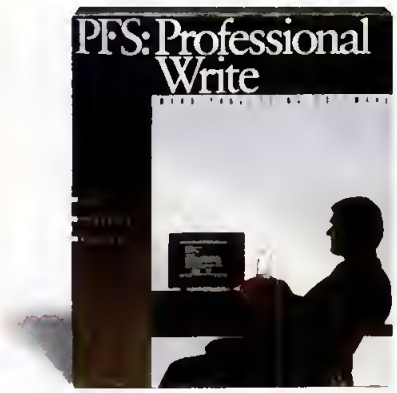
**Xmodem** See error-checking protocol.—**Winn L. Rosch**

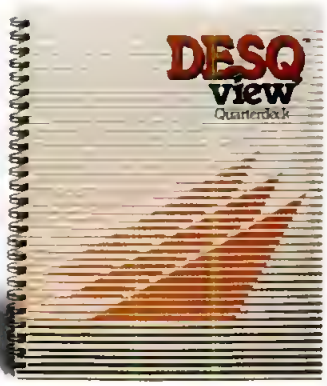
mance at 1,200 bps. Our tests show that most of the 2,400-bps modems, while lackluster at the higher rate, turned in great results when running at 1,200 bps. Moreover, an inexpensive 2,400-bps modem can be had for less than one of the high-end 1,200-bps models. And if you opt for a higher-speed modem, you'll have the 2,400-bps option available when needed.

The price difference between different manufacturers dwarfs the difference between the internal and external modems of any given manufacturer. Exactly how much you should spend depends on what you're looking for and what you're willing to settle for. As with any other PC product, you should carefully consider every aspect of your modem purchase before making your decision: select the one that you're absolutely sure you want, then settle for the one you can afford. PC

*Winn L. Rosch is a contributing editor of* PC Magazine.

# Even the best programs can be improved.





*PC Mouse* *Microsoft™ Mouse*

*A mechanical mouse has moving parts that make it less reliable, less accurate, and so dirty it actually needs a good cleaning now and then. PC Mouse has no such parts. Or problems.*

Saving this much money on software this good could easily make your day. But put that savings together with our new PC Mouse, and you've got a deal (actually you've got six of them), that's tough to pass up.

Our new PC Mouse makes even the best programs better. Easier to work with. Quicker to get around in. But besides that, it's also the best mouse going.

What makes PC Mouse so good?

For one thing, it has no moving parts. And that means no problems.

PC Mouse is optical. It uses a mirror-like pad to reflect a tiny beam of light. So it's faster, more accurate and so reliable it's the only mouse with a lifetime warranty.*

In addition to this specially-priced software, PC Mouse also works with any software program written for use with a mouse. And quite a few that aren't. Just use our Designer Pop-up™ menus, to create your own mouse-driven software. It's included free.

When you order, make sure you specify PC Mouse in either the serial version or, for $20 more, the new Bus Plus model which includes its own serial card.

Either way, you're getting the best of all possible worlds.

The best programs and the best mouse. Now, all at the best price.

*Limited lifetime warranty applies to hardware products only. Warranty limited to North America. Contact Mouse Systems for details. Mouse Systems and Designer Pop-up are trademarks of Mouse Systems Corp. Other brand or product names are trademarks or registered trademarks of their respective holders. © 1987 Mouse Systems Corp., 2600 San Tomas Expwy., Santa Clara, CA 95051

CIRCLE 350 ON READER SERVICE CARD

Call 1-800-523-5189
Or, fill out this coupon and send to: Mouse Systems, Dept. 10, 2600 San Tomas Expwy., Santa Clara, CA 95051

| I want to order this software and... | PC Mouse | or | PC Mouse Bus Plus |
|---|---|---|---|
| ☐ Harvard Professional Publisher™ | ☐ $599 | or | ☐ $619 |
| ☐ First Choice™ | ☐ $199 | or | ☐ $219 |
| ☐ PFS® Professional Write™ | ☐ $219 | or | ☐ $239 |
| ☐ Reflex™ | ☐ $189 | or | ☐ $209 |
| ☐ Desq View™ | ☐ $179 | or | ☐ $199 |
| ☐ Drafix 1™ | ☐ $299 | or | ☐ $319 |

Sub-total: _____
Add 7% sales tax if a CA resident: _____
Add $6.50 shipping & handling: _____
Total Amount: $_____

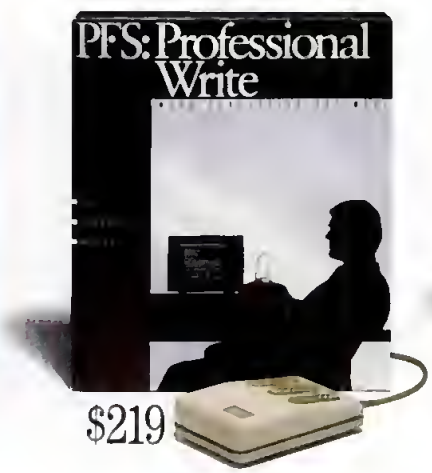
Please charge my ☐ VISA ☐ M/C
Expiration date: ___/___/___
Card Number: _____
Name on card: _____

Name _____
Street Address _____
City _____ State _____ Zip _____
Phone _____
Signature _____
Or send check or money order made payable to:
Mouse Systems Corp.

MOUSE SYSTEMS CORP.

# With our mouse and these prices.

$189




$219

$299

$179

$199

$599

## Amazing Things Inc.

The most memorable thing about the Amazing Things modems is that they come with a very good communications program at a price that's difficult to beat. These modems are not actually made by Amazing Things; they're made by OmniTel, and for all intents and purposes, this pair of modems is identical to the pair sold by OmniTel and the pair sold by Leading Edge—from the designs of the boards to the layout of the manuals. The only differences I could find were price and noise tolerance.

Thus, if you find yourself interested in any one of these modems, you should also check out the Leading Edge, PC's Limited, and OmniTel reviews.

Amazing Things modems come with a very good communications program at a price that's difficult to beat.

The Amazing Things Model A Series 1200B offers as many well-designed features as any modem I reviewed, such as compatibility with the Hayes Smartmodem 1200B and the Hayes command set, 300/1,200-bit-per-second operation, tone and pulse dialing, automatic and manual dial and answer, automatic speed and parity checking, analog loopback testing, and the ability to be configured for COM1, COM2, COM3, or COM4.

The Model A Series 1200B is an internal modem designed on a half-length card that fits in any open slot of your PC. (However, it will not run in the short slot of an IBM PC-XT.) With its DIP switches and jumper pins set for the most common defaults, installation and setup may be accomplished in several minutes. You just plug the card into a slot, plug in the line (and optionally the phone jacks) to the rear panel of the modem, copy the communications program disk to your floppy or hard disk, and boot up. Once the modem is installed, you can change the DIP switch settings through a little window on the rear support bracket of the modem. A delightful detail on this modem is the volume screw located just below the window for the DIP switches, allowing you to experiment with volume settings after you have installed the modem.

The *Bit Com* communications software that comes with the Amazing Things modems is not copy protected, and there is no lengthy setup procedure. After copying all the files to your working disk, you simply type BITCOM. An option from the main *Bit Com* menu lets you configure the modem's communications parameters in less than 60 seconds by accepting defaults or typing over them. I was on-line with MCI Mail 5 minutes after I slit the shrink wrapping on the box. *Bit Com* is a very good communications program, both for first-time users and for seasoned telecommunicators. The entire program is menu driven and logically arranged, and it offers everything most users demand from their Hayes or Hayes-compatible software.

The analog loopback test built into the modem allows you to simulate on-line operation to check your setup. If the test fails, you can reset the parameters before you actually spend money trying to communicate with another computer or a database. I don't think anyone who has installed a modem before will need this test because it's so easy to get the modem working. But if you're new to all this, then you'll appreciate the loopback test.

**GOOD PRICE** You can't get a much better price on a 1,200-bps Hayes-compatible modem with communications software than $150. You can, however, get a modem with better noise tolerance than that of the Model A Series 1200B without paying much more. In line-noise resistance tests, the modem was able to transmit without error on the good and average lines, though it showed scores in the lower percentiles of the 1,200-bps modems. On the poorest quality line, it was unable to transmit without error.

If I were buying a modem for personal use, the 1200B's poor test results wouldn't bother me too much because in my on-line use of the modem I was never interrupted by noise. But if you're going to be transmitting lots of important files, the test results on this modem just don't give you a lot of confidence in its ability to perform reliably.

Here's what it boils down to: you can either buy this modem for its great features, good software, and excellent price, or you can buy another modem for its better noise tolerance. Your choice really depends on your needs and whether or not you want to worry about reliability.

The Amazing Things Model A Series 2400B is identical to its little brother, the 1200B, offering the same features and same basic performance, with the additional ability of running at 2,400 bps. Considering the inclusion of the *Bit Com* com-

## AN ENLIGHTENING SUGGESTION

Internal modems don't have status lights because they can't have status lights, right?

That's the conventional wisdom. But a smart modem maker could prove the prophets wrong and make a bundle in the process. Here's how you could have an internal modem *and* status lights:

Build a connector for status-light information on the back panel of the internal modem. Run an 18- or 24-inch ribbon cable to the front of the PC and connect it to a status-light cube or box that need be no bigger than 2 by ½ inches tall. Attach the box to the system unit or monitor with double-stick tape or Velcro.

While PC Labs tests show significant differences between modems, many buyers believe a modem is a modem is a modem. So a feature that sets one apart from the pack could be a strong buying consideration.—**Bill Howard**

munications program, the 2400B is also bargain-basement priced.

Running both the Amazing Things modems with Hayes software yielded no problems, and both responded to every Hayes command I typed. However, like the 1200B, the 2400B isn't very noise-tolerant. At both 1,200 and 2,400 bps, it performed excellently on the the best line, poorly on the average line, and would not transmit without error on the worst line.

On a clean phone line, this would be my choice for an inexpensive Hayes-compatible 2,400-bps modem. But if the intended phone lines have dirty connections or poor-quality service, I'd pass up this bargain.—**Phil Wiswell**

PC MAGAZINE FACT FILE

**Amazing Things Inc.**
57 Providence Hwy.
Norwood, MA 02060
(617) 551-0880

*Like Leading Edge modems, Amazing Things modems are made by OmniTel.*

① **Amazing Things Model A Series 1200B**
**List Price:** $149
**Requires:** Half-length slot.
**In Short:** A bargain-basement 1,200-bps internal modem with a good set of features but low noise resistance.
CIRCLE 647 ON READER SERVICE CARD

② **Amazing Things Model A Series 2400B**
**List Price:** $289
**Requires:** Half-length slot.
**In Short:** An attractively priced internal 2,400-bps modem whose performance is less than inspiring. A good buy only if it will be used on excellent telephone lines; otherwise, beware.
CIRCLE 646 ON READER SERVICE CARD

## AT&T Information Systems

AT&T Information Systems is the company that invented modems. Back in the fifties, the government established a system called DEWline (for Distant Early Warning) to alert the air-defense establishment in case of a strike by Soviet bombers across the North Pole. To get urgent data from the DEW installations to data-gathering locations in the United States instantly, the modem was invented.

In the days before the Carterphone decision, the only way users could get a modem was to lease one from AT&T. Post-Carterphone, independents could manufacture and sell them. Now that divestiture is with us, AT&T is competing in the retail market. AT&T modems are sold separately or as a part of a complete system solution that includes the company's computers.

I tested three modems: the AT&T Model 4112 half-card internal modem, the AT&T Model 4000 external 1,200-bit-per-second modem, and the AT&T Model 4024 2,400-bps modem.

The 4112 came in a box packaged with *Softcall*, AT&T's communications software. The modem passed Hayes-compatibility tests, so any software that handles Hayes modems (and almost all the packages do) will work with this modem.

The 4112 is a half-slot modem, so I opened the top of my Compaq Deskpro (no mean feat) and installed the modem. The easiest slot to reach was slot 8, so I decided to put the modem there. A small four-position switch on the board required setting and a search in the user's manual to find out how to do that. Here was the first problem I encountered: the manual is almost useless in explaining how to set these switches. There is a picture of how the switch was set from the factory, but PC Labs had already conducted some tests on this modem before I got it, and the settings were not the same as the ones in the picture. The switch does not say what position is on and what is off, nor is that basic fact illustrated.

Consequently, I had to use an ohmmeter to tell if the switches were open or closed. I then set them the way I thought they should be set, plugged in the modem card, connected the phone line to the proper modular connector (there are two: one for the line and one for a telephone; both are marked), and booted the *Softcall* program. It told me the modem wasn't working right and said to check the modem connections.

I eventually discovered the problem. Switch two in the row of four is a slot 8 switch, and the instructions say to turn it on only if the modem is in slot 8 of an IBM PC-XT. Mine was in slot 8 of a Compaq Deskpro, so I had turned the switch off, which was, of course, the wrong thing to do. Resetting the switch solved the problem, as did moving the modem card with the switch on. The other switches are used to configure the modem communications port (COM1 or COM2 only) for use with a multiline or single-line phone or for carrier detect support. Other settings are accomplished through the use of Hayes commands.

**Using the AT&T Model 4112 is straightforward with any communications software.**

There is a speaker on the board that requires no connection to anything else, so once the switches are properly set, the telephone line connected, and the card plugged in, you're in business. The telephone modular sockets peek out the back of the computer just the way they should, so connecting the phone line is simple, as long as you remember which socket works for which line.

Using the modem is straightforward

Photographs: Thom O'Connor

with any communications software. I had no problem as long as I remembered to reconfigure for port 2 since I have a serial card configured as port 1. The modem did its thing quite well, repeatedly. It dialed, hung up, changed response codes, and so forth, flawlessly.

In fact, the only things I didn't like about the modem card were the manual and the need to open the case of the computer (which most people would do only once). The good news about the case opening, of course, is that the modem takes up no desktop space.

**THE EXTERNAL UNITS** The other two modems from AT&T are external units. The 4000 is a 1,200-bps device, while the 4024, as you would expect, runs at 300, 1,200 or 2,400 bps. I cannot say anything about the construction of the Model 4000 since I couldn't get the case open. It is assembled with plastic spring members holding the top of the case and the bottom together, and without special tools I believe that the darn thing will just not come apart. But the front panel of the modem is equipped with four signal lights for Modem Ready, Carrier Detect, Send/Receive, and Auto Answer. You set the parameters of the modem using the Hayes-compatible set of commands.

I encountered no problem with this procedure, and the modem performed perfectly in changing parameters and in calling bulletin boards at two speeds. In the back of the modem are the RS-232 connector and three modular phone sockets. Two of those sockets are RJ-11, which are used for connecting the modem to the phone line.

The other socket is smaller and colored red, and it's used for the power line. For some reason, AT&T decided to put a modular jack on the end of the line connected to the supplied wall transformer. I tried, with the power off, to plug this jack into the phone sockets, and it worked fine, which means that someone else could do the same thing. Would this be a safety hazard? No, because the transformer voltage is 19.5 volts, which is less than the ring signal voltage on the phone system. But it does mean that it's just that much easier to mess up the connections. The modular socket for the power lead and the modular plug are both red, so red plugs to red, making it easier. Still, one wonders why AT&T chose such an odd way to convey power to the modem.

The Model 4000 measures 4 by 1¾ by 9 inches. The Model 4024, which measures 6 by 1½ by 9¾ inches, has a single screw that holds it together, so it's easy to get inside and set the switches. This modem's manual is quite different from that for the 4112, and the switch settings are clearly explained. The factory default settings set the modem up to wake up, when the power is applied, in the Hayes-compatible state, so that it will automatically set its speed from the AT command that is sent to get the modem to do anything. Thus there is really no need for the user to open the box at all. I found that I wanted to because the default on the switch sets CTS, RTS, and DTR on all the time. What this means is that my communications software wouldn't turn the modem off in the normal way. Simply resetting the switch cleared that up.

A look inside revealed some manufacturing processes that are a little shaky, however. There are several wire jumpers on the main board (there are two boards, one piggybacked on the other). In one lo-

## PC MAGAZINE FACT FILE

**AT&T Information Systems**
AT&T Customer Information Center; P.O. Box t9901; Indianapolis, IN 462t9; (800) 432-6600

*AT&T Information Systems, the company that invented modems, offers three modems that perform fairly well but are expensive in today's expanding marketplace.*

① **AT&T Model 4000**
**List Price:** $499
**Requires:** Asynchronous communications adaptor or terminal with RS-232 port, serial cable, communications software.
**In Short:** An external t,200-bps modem that takes up little space and performs well. At $500, it's a bit pricey.
CIRCLE **642** ON READER SERVICE CARD

② **AT&T Model 4112**
**List Price:** $489
**Requires:** One half slot.
**In Short:** A competent 1,200-bps half-card modem that is easy to install and use, except for confusing documentation. The modem performed well in Hayes-compatibility tests and in communications exercises.
CIRCLE **641** READER SERVICE CARD

③ **AT&T Model 4024**
**List Price:** $750
**Requires:** Asynchronous communications adaptor or terminal with RS-232 port, serial cable, communications software.
**In Short:** An external 2,400-bps modem that seems to perform adequately. At times it would not connect at 2,400-bps speed. With its $750 tag, it's a bit pricey.
CIRCLE **643** ON READER SERVICE CARD

cation, insulated jumpers run from one location to two others on two separate integrated circuits. The insulation was cut and put onto bare wire, a time-consuming, and therefore expensive, procedure. At another location, what looks like trimming capacitors were assembled in the same way around an unmarked integrated circuit.

It can also mean, however, that there are still some problems with the product. I have no evidence for the latter possibility in this case, except that the 4024 had some difficulty, at times, connecting at 2,400 bps (and none at 1,200). The modem achieved average results on the PC Labs line-noise resistance test, and it may be that my phone lines are noisy. But on several occasions, I was able to connect with CompuServe over Tymnet at 2,400 bps, and then at other times, although the modems swapped carriers, Tymnnet's modems couldn't understand the characters that mine was sending.

Model 4024 has five lamps on the front panel—a DTR/test lamp that tells the status of the DTR line, a carrier detect lamp, a send/receive data lamp, a status lamp (which just stays on when Hayes-compatible operation is selected, but indicates errors in AT&T command mode), and a data lamp that doubles as a data/talk switch. In addition, the volume control for the built-in speaker is located on the front panel, a nice touch.

The AT&T command mode puts the user into a different set of commands for utilizing the functions of the modem. This mode would be useful when the terminal really is a terminal, not a computer running a communications software package. The modem provides a lot of information when it is in AT&T command mode that would not be available on a terminal but is available from communications software packages. The Model 4024 can store 36 telephone numbers in its AT&T command mode, but only one in the Hayes-compatible mode. It can also be used for synchronous communications and in leased-line applications.

These modems are competent. Each of them has its own capabilities and quirks, of course, but on the whole they should perform adequately.—**David Gabel**

## OUR REVIEWERS

**Christopher Barr** is a frequent contributor and SYSOP of the PC Magazine Interactive Reader Service.

**Frank Bican** is a departmental computer resources supervisor at a Cleveland medical center.

**Marvin Bryan** is an advertising executive in Detroit, Michigan.

**Steve Cummings** is a California-based free-lance writer and computer programmer.

**John Edwards** has been writing about technical subjects since the late 1970s.

**David Gabel** is the coauthor of *How to Get Your Personal Computer to Communicate*.

**Chris Johnston** is a frequent contributor to *PC Magazine*.

**Howard Marks** is an independent systems consultant and free-lance writer based in New Jersey.

**Dara Pearlman** is a free-lance writer and computer programmer based in Cupertino, California.

**Jon Pepper** is a frequent contributor to *PC Magazine*.

**Robin Raskin** is a free-lance writer and frequent contributor to *PC Magazine* who is based in New York City.

**Winn L. Rosch** is a contributing editor of *PC Magazine*.

**Walt Rowinsky** is a free-lance technical writer based in Lakewood, Ohio.

**Phil Wiswell** is a microcomputer consultant and frequent contributor to *PC Magazine*.


THE MODEM FOR PEOPLE WHO TAKE THEIR ACT ON THE ROAD.

When you travel with your portable computer, make sure your communications go with you. The WorldPort 1200™ Portable Modem is the only modem you need, whether you travel across the country or around the world.

While most portable computers offer an optional modem of some type, only the WorldPort 1200 gives you all the features required for true portability. Features like battery-powered, Hayes™ Command Set compatibility, Bell and CCITT standards, direct and acoustic cups interface for 300 and 1200 bps, and compact size.

Equally at home on your desktop, the WorldPort 1200 works with virtually any computer with a RS-232C serial port. No more of those dedicated internal modems that can only be used with one computer.

The WorldPort 1200. At only $199, you can't afford to leave home without it.

For more information or your nearest dealer, contact us today.

TOUCHBASE SYSTEMS, INC.
16 Green Acre Lane
Northport NY 11768
(516) 261-0423
Telex 6502848020

Hayes is a registered trademark of Hayes Microcomputer Products Inc

CIRCLE 185 ON READER SERVICE CARD FOR DEALERS
CIRCLE 186 ON READER SERVICE CARD FOR OTHER BUYERS

# If you can see all this with your PC, why look anywhere else for 3X communications?

Here on this page we offer you a graphic display of the latest developments in PC to IBM System 3X connectivity.

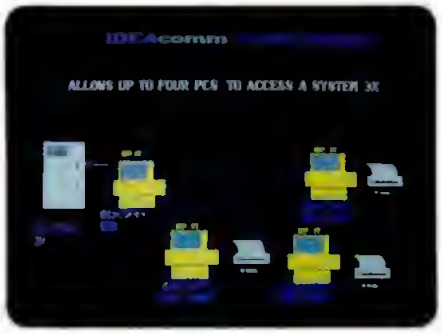
Each advancement is a direct result of a simple yet definitive belief. A belief that proposes if you listen to what people want, then you have a better chance of giving people what they need.

This is precisely the spirit that has made us the leader in PC to 3X communications. A position earned through progressive thinking and supported by progressive products.

*IBM 5292 Model 2 graphics*

*Windows with multiple host sessions*

*IBM 3180 terminal emulation*




*5251/Share for additional users*

With 5292 Model 2 emulation you can create and print graphs right on the PC using 3X applications such as IBM's Business Graphics Utility. This eliminates the purchase of a $7,000 graphics terminal.

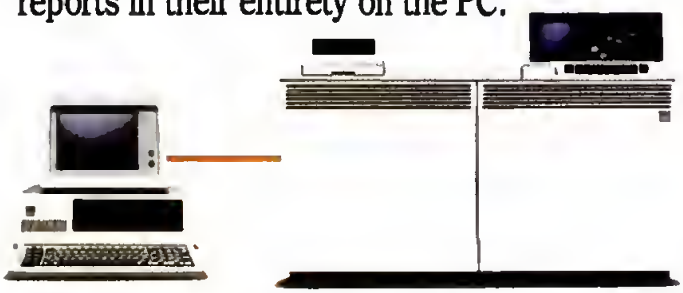
You can revel in 3180 terminal emulation that transforms your PC into a full 132-column display terminal. Use it to view expansive 3X financial or data processing reports in their entirety on the PC.

Our windows feature multiple host sessions. You see the real time status of up to four sessions on one PC screen.

If you need to connect additional users, but communications ports or station addresses are limited, consider IDEAcomm 5251/Share. Up to three user PCs, each emulating two sessions (terminal and printer), can access the System 3X through software.

We also have IDEAcomm 5250 products for remote synchronous communications.

Call us at 800-257-5027. Because when it comes to 3X communications, only one company displays this much power.



IDEAssociates™
The Leader in PC Technology.

IDEAssociates, Inc., 29 Dunham Road, Billerica, MA 01821, (617) 663-6878, Telex 4979780; France, Switzerland, Germany, United Kingdom, Hong Kong.
IBM is a registered trademark of International Business Machines Corporation.

CIRCLE 494 ON READER SERVICE CARD

## Basic Time Inc.

Basic Time's 15 years of experience as a manufacturer and distributor of computer peripherals is reflected in the modems the company has chosen to market. With the exception of its 2,400-bit-per-second external modem, the Basic Time 2400E, the modems are good performers and are well constructed. Aimed at the lower end of the modem market, Basic Time's 1,200- and 2,400-bps modems are good values for their moderate suggested retail prices.

The Model T of the company's line is the internal Basic Time PC212A/1200 1,200-bps modem. Conventionally constructed of large components spread out on a full-size card, the PC212A/1200 is definitely not at the forefront of new modem technology. But like Ford's venerable vehicle, the modem is solidly and neatly put together. This modem gives every promise of providing years of reliable and no-nonsense service.

Aimed at the lower end of the modem market, Basic Time's modems are good values.

A glance at the PC212A/1200's back end confirms the no-nonsense impression. Basic Time has thoughtfully included a serial port on the card—a practical plus in an age when expansion slots are at a premium. The serial port manifests itself as a 25-pin male RS-232 connector set just below the two clearly marked phone jacks on the modem's rear plate.

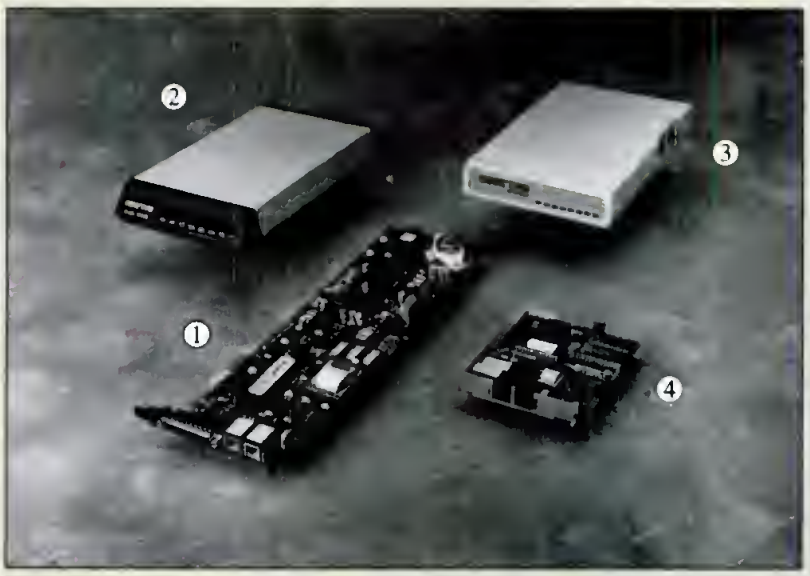
The presence of a 25-pin connector in addition to the standard 9-pin connectors turned out to have extra value when the modem was tested in an AT clone. It allowed for a welcome recycling of the 25-pin cables that had come with various serial printers and the like over the years.

Still, it's impossible to get everything. Putting the serial port on the PC212A/1200 meant that something had to go. What went was the modem's speaker volume control knob.

Basic Time's manufacturer solved the problem by putting the volume control in an upper rear corner of the card. To adjust the volume, the PC's case has to be opened—but only about an inch. The volume control knob is set in vertically, so it's very easy to adjust it from above. Since most people never touch the control after the initial setting, having the manual volume control inside the PC really isn't a disadvantage.

### PC MAGAZINE FACT FILE

**Basic Time Inc.**
3040 Oakmead Village Dr.; Santa Clara, CA 95051; (408) 727-0877




*Marketed with bargain hunters in mind, Basic Time's modems are reliable and rugged. The exception is the 2400E, which performed adequately but proved to be untestable.*

① **Basic Time PC212A/1200**
**List Price:** $199
**Requires:** One full-size slot.
**In Short:** The PC212A/1200 is the perfect modem for anyone looking for good performance in a "basic black" modem. The on-board serial port is a definite plus in an expansion-slot-hungry world.
CIRCLE **622** ON READER SERVICE CARD

② **Basic Time 212A/1200E**
**List Price:** $199
**Requires:** One full-size slot.
**In Short:** The 212A/1200E is a stodgy workhorse of a modem. Ruggedly constructed, it's likely to provide many years of reliable performance.
CIRCLE **621** ON READER SERVICE CARD

③ **Basic Time 2400E**
**List Price:** $359
**Requires:** Serial port.
**In Short:** The 2400E looks better than it performs. Basic Time has a dud on its hands that should not be allowed to reflect on the other products the company offers.
CIRCLE **619** ON READER SERVICE CARD

④ **Basic Time 2400I**
**List Price:** $359
**Requires:** One short slot.
**In Short:** The 2400I can hold its own against higher-priced products. It provides good quality for a moderate price.
CIRCLE **620** ON READER SERVICE CARD

**CRYPTIC SETUP INSTRUCTIONS**

Setup was a bit of a chore, taking around 30 minutes. The process consisted of setting three DIP switches and repositioning some jumpers to configure the modem and serial port for COM1 and COM2, respectively. In normal circumstances, setup should take only about 5 minutes, but cryptic instructions on how to set the jumpers made confusion inevitable.

A handy feature is that the jumpers can be configured so that the modem and serial port can operate through any combination of the two ports. The modem can take up COM1 while the serial port is COM2, or vice versa. The serial port can either share a port with the modem, in which case it can't be used when the modem is in operation, or one of the devices can be disabled.

The user's guide is the major problem with this modem. Written in broken English, it's poorly structured and assumes a great deal of previous experience by the user. What's needed is a supplemental manual like the one included with Basic Time's 1,200-bps external modem.

In PC Labs tests, the PC212A/1200 performed better than average, landing in the top third of the modems tested. It was able to handle more telephone line noise than the average modem and outperformed Basic Time's external 1,200-bps modem.

In subjective testing, the PC212A/1200 performed well. It appears to be functionally Hayes compatible, both at 300 and 1,200 bps, and showed no sensitivity when installed in an AT clone running first at 6 MHz and then at 12 MHz.

Nor did the modem exhibit any difficulty working with *Crosstalk XVI*, *Smartcom II*, or *PC-Talk III* communications software. *PC-Talk III* is included in the PC212A/1200's $199 suggested retail price. Also included in the package is a phone cable and the user's manual.

Like its internal cousin, the company's external 1,200-bps modem, the Basic Time 212A/1200E, is a respectable, working-class machine. The modem's circuitry is housed in a traditionally shaped gray metal case. The weight of the housing virtually ensures that the modem is not going to be accidentally knocked off any desktop. The styling of the case anticipates that, more than likely, the telephone will be set on top of it.

The front of the modem features the standard row of eight status indicators and a sliding panel that gives access to the modem's DIP switches. Having the switches at the front made setting up the 212A/1200E very easy.

The modem's rear panel is crowded. It includes a toggle on/off switch, a jack for the transformer, a female 25-pin RS-232 connector, one telephone jack, and the volume control for the internal speaker. The positioning of the telephone jack makes it impossible to insert a Y-connector, so the desk phone would have to be cabled to a wall jack.

> The Basic Time 212A/1200E's board looks like it could be drop-kicked and still function.

Internally, the 212A/1200E's circuitry reflects the modem's boilerplate image. The connections are solid and neatly made, and there are no loose wires. The board looks like it could be drop-kicked and still function.

Setting up the modem was easy. It took less than 5 minutes to set the DIP switches, connect the power transformer, and plug in the cables. The process was helped enormously by a succinct loose-leaf user manual. All of the setup information was concentrated in the first six pages of the manual, where it belongs.

The manual's large illustrations made a simple job out of setting the DIP switches. They made it very clear that a separate switch configuration was necessary if the modem was to be used with *Crosstalk XVI*.

A second manual, written in broken English, is included with the package but will be of little help to the novice user; it doesn't even mention the switch settings required for *Crosstalk XVI*. However, it contains information that will be valuable to very technical users.

In operation, the 212A/1200E proved to be functionally Hayes compatible at both 300 and 1,200 bps, and worked flawlessly with *Smartcom II*, *PC-Talk III* and *Crosstalk XVI*.

PC Labs tests showed that the modem was somewhat more sensitive to poor line quality than its internal counterpart. On marginal long-distance lines, the 212A/1200E, in effect, has to shout in order to avoid errors.

The 212A/1200E may not be inspiring, but it is a good piece of technology. It's full-featured and built to take a lot of punishment while giving a lot of use for its $199 suggested price.

**CLEAN-LOOKING CONSTRUCTION**

The Basic Time 2400I, a 2,400-bps internal modem, is a darn good piece of hardware. What keeps it from being great is its lack of a volume control for its over-loud, gravelly sounding speaker. Otherwise, the 2400I gives good value for its $359 suggested retail price.

The modem is a clean-looking bit of construction. All of the components are mounted on a true half-size card. And, unlike some half-size modems, where some components are double-layered, nothing on the 2400I comes even close to protruding far enough to interfere with cards installed in adjoining slots.

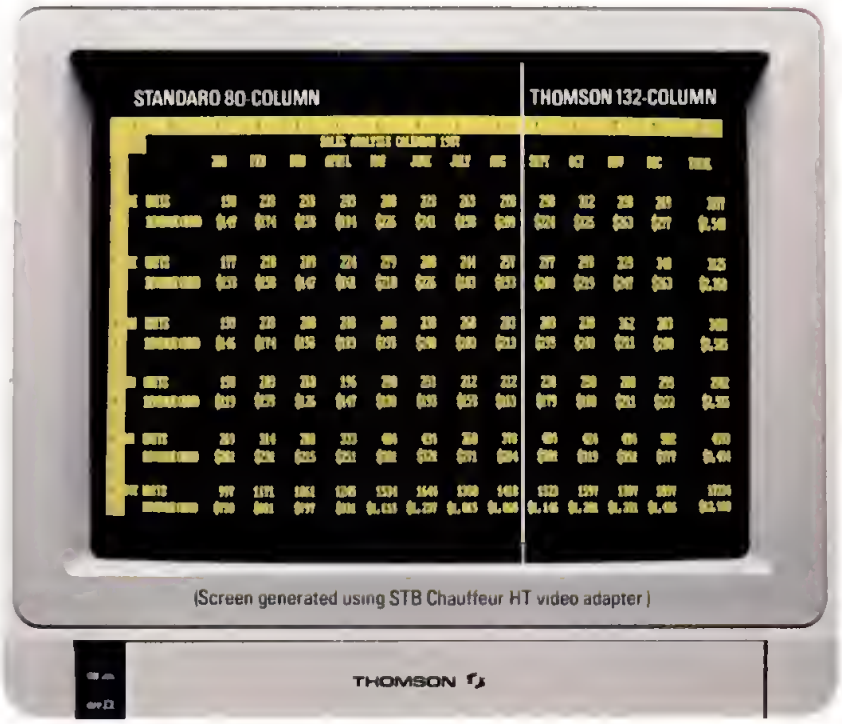
Installation was simple, consisting essentially of plugging the card into an open slot and connecting a phone cable to the lower of the modem's two clearly marked phone jacks. The only potential problem in the setup had to do with designating which serial port the modem occupied, COM1 or COM2.

Configuring the modem for the correct port just requires a jumper to be either left in place or removed. That much is explained in the user's guide. As to where the jumper is or what it looks like, the manual doesn't give a clue. Heaven help the novice user.

Any other configuration is done through software, the user issuing commands to the modem's internal memory. For the most part, that shouldn't be necessary; the factory settings appear to take care of the majority of situations. The modem does lack a software volume control for the speaker. The present volume is

Now $545* Buys You
The Complete Solution—
Thomson 450A & STB® Chauffeur HT.®

# Buy Eight Months, Get Four Free.



(Screen generated using STB Chauffeur HT video adapter)

## The Thomson Spreadsheet Monitor

Standard 12″ monitors let you work with about eight months of spreadsheet data at once. Which is fine if you live by eight-month years.

Most people, however, are used to *twelve* months on the calendar. But unless you enjoy scrolling and squinting—and a lot of it—you can't work with a full twelve months of data on a regular 12″ monitor.

So it's for you, frustrated spreadsheet user, that Thomson proudly introduces the 14″ SPREADSHEET MONITOR. Using the necessary graphics card, it not only lets you see 132 columns of data all at once, it lets you see them with 80-column clarity.

Which means 65% more spreadsheet. More windows. More detail. And, of course, no more scrolling from August to December, or eyes giving out from strain in mid-September. And at $295* (what you could easily pay for a 12″ monitor), it's like getting those extra four months on the screen for free.

**Call 1-800-325-0464** (in Calif., 1-800-237-9483; in L.A., 213-568-1002) to find out where you can buy the Thomson SPREADSHEET MONITOR. Do it now—who knows how many months you've lost already?

**THOMSON**
**The Vision of Personal Computers™**

*© 1987 Thomson Consumer Products Corporation*
*5731 W. Slauson Avenue, Suite 111, Culver City, CA 90230*

**Suggested retail price. Thomson is a trademark of Thomson S.A. STB and Chauffeur HT are registered trademarks of STB Systems, Inc*

CIRCLE 103 ON READER SERVICE CARD

what the user has to live with—that is, a speaker that's a little too loud unless it's turned off completely.

In PC Labs testing, the Basic Time 2400I held its own against the higher-priced competition. At 1,200 bps, its scores in tests measuring resistance to error-causing transmission line noise were about the same as comparable Hayes and IBM 2,400-bps modems. Conservatively, the 2400I ranked among the better performing modems in the test. At 2,400 bps the modem didn't do as well as the Hayes, and we wouldn't recommend it for use at that speed. But if you're considering buying a high-speed modem for better 1,200-bps performance, this would be a good choice.

The 2400I also looked good in subjective testing. It's functionally Hayes compatible. Running the modem through a set of standard Hayes commands at 300, 1,200 and 2,400 bps didn't reveal any inconsistencies or incompatibilities. It worked well with both the *PC-Talk III* communications software that's bundled with the modem and with *Smartcom II*.

As with Basic Time's external 2,400-bps modem, getting the 2400I to work smoothly with *Crosstalk XVI* required a minor bit of fiddling with the both the communications software and the modem's internal configuration.

The complete package for the 2400I includes the modem, a phone cable, an instruction book, and a copy of *PC-Talk III* communications software.

In appearance, the company's 2,400-bps external modem, the Basic Time 2400E, comes close to being the ultimate inconspicuous gray-flannel peripheral. If anything, it looks like an only slightly modified 9- by 5½- by 1½-inch block of light gray plastic.

That appearance gives the promise of an honest, no-nonsense piece of equipment. The promise is echoed by the modem's $359 suggested retail price. However, that promise is not kept.

The modem is designed to have a desk phone perched on top of it. But one look at the 2400E should convince anybody that this modem should be standing on edge, stuck to the side of PC, or even glued to a wall.

The modem's front-panel displays Basic Time's logo and a standard bank of eight status lights. The back of the modem looks almost as empty, having only a connector for the power cord, a push-button on/off switch and a female RS-232 connector for the serial cable.

Interestingly, the two clearly marked telephone jacks are set into the right side of the modem. That position could irritate some users because it invites phone cables to trail all over a desktop. To avoid that, the modem definitely has to be placed to the left of the PC.

The Basic Time 2400E comes close to being the ultimate inconspicuous gray-flannel peripheral.

Inside, the 2400E's circuitry is neatly constructed. The parts most likely to be abused—the on/off switch, power connector and RS-232 connector—are solidly secured to the circuit board. The RS-232 connector is additionally buttressed by being screwed to the bottom half of the modem's case.

**DESIGN OVERSIGHT** There was evidence, however, that there may have been a design oversight in the construction of the modem's circuit board. Two short wires were soldered to the bottom of the board, evidently in order to complete two connections. The connections looked like the manufacturer was trying to correct a mistake.

Further problems surfaced when the modem was installed. Setup was pretty much automatic. All that had to be done was to plug in the cables and turn the power on. There are no DIP switches. All configuration is done by the modem's internal software. Users have the ability to modify the preset configuration if necessary and store it in the modem's memory to be brought up automatically every time the unit is turned on.

The moment the power came on, so did the Carrier Detect (CD) LED on the 2400E's front panel. The CD light resisted all attempts to turn it off. Those included issuing every command that seemed relevant and running a somewhat awkward self-test and diagnostics.

Still, the 2400E didn't seem to be affected by whatever was causing the problem with the CD indicator. The modem reacted properly to a full set of Hayes commands. The commands were tried at three of the modem's rated speeds—300, 1,200 and 2,400 bps—with the same good results.

The modem also performed well with *Smartcom II* and *PC-Talk III* communications software. Getting it to work with *Crosstalk XVI* took a little fiddling with the software, adjusting the commands.

Two things stood out during the testing. One was that the modem was sluggish when it came to tone dialing. The individual tones were paced farther apart and seemed to last longer than the tones produced by the other modems evaluated.

The other thing was that the speaker volume and tone were irritating. There is no volume control on the 2400E, either physically or through the software. The volume on the evaluation modem was set too high. What made the matter worse was that the internal speaker had a very harsh sound to it.

Finally, due to compatibility problems that remain unsolved, the 2400E could not be tested using PC Labs equipment.

The 2400E comes with a transformer, phone cable and user manual. The package does not include software or a serial cable.—**Walt Rowinsky**

## Black Box Corp.

Buying electronic products from a catalog has always been a popular way to shop, though it has obvious pluses and minuses. One advantage is that you can take your time before choosing, look at the pictures, read the specs, compare prices, and decide if this particular piece of hardware or software is what you want. On the down side, unless you buy a name-brand product you can't be sure of the reliability, and there is

# Turtle Souped

If it seems that the more you have to do, the slower your database wants to do it, there's a very simple solution.

The Clipper™ compiler from Nantucket.

Just run your dBASE™ applications programs through Clipper and watch them fly. Then as your business grows, Clipper will grow with you.

Clipper already includes far easier networking and there's no extra charge.

It has an extended language that makes applications easier than ever before. We've included commands for quick menus, fast screens, arrays, more fields and memory variables and other enhancements. Or if that's not enough, with Clipper you can even define your own functions and customize dBASE so it does exactly what you want it to do.

And once your programs are compiled, you can distribute as many copies as you like with full source code security and no licensing or runtime fees.

Database users are saving time and money with Clipper at 3M and Touche Ross, Exxon and TRW, and tens of thousands of businesses around the world.

To find out more, contact: Nantucket Corp., 12555 W. Jefferson Blvd., Los Angeles, CA 90066.

Or call (213) 390-7923 today.

Clipper can put you on the fast-track today.

Nantucket®

© Nantucket Corporation 1987 Clipper is a trademark of Nantucket Corporation, dBASE isn't In Europe Nantucket Corporation (Europe) 2 Bluecoats Avenue, Fore Street, Hertford, Herts SG14 1PB Telephone 0992 554621

CIRCLE 196 ON READER SERVICE CARD

no local repair shop to run to. In the case of Black Box, however, there's a 1-year warranty in addition to a 30-day money-back guarantee.

The company's Dial Modem 24 Plus is a solidly performing 2,400-bit-per-second modem with a reasonably complete features list. In PC Labs performance tests, transmissions at both 1,200 and 2,400 bps were relatively trouble free, though, like most 2,400-bps modems, the Dial Modem performed better at 1,200 bps.

The modem's features include operation in either asynchronous or synchronous modes, support for both Bell 212A and CCITT V.22 protocols at 1,200 bps, and implementation of MNP error correction. One telephone number can be stored in nonvolatile memory. So can the configuration settings you select through software, but since DIP switch settings take priority this feature isn't extremely useful. No data buffer is provided. There's nothing unexpected or complicated about getting up and running with this modem. The unit is configured at the factory to emulate the Hayes Smartmodem 2400, so most users won't need to set any DIP switches. Serial and telephone cables plug into corresponding connectors on the rear panel. The connectors are labeled properly, but the labels are visible only from the rear. One telephone cable is supplied with the unit.

**SEPARATE POWER SUPPLY** Like many external modems, the Black Box Dial Modem 24 Plus comes with a separate power supply that plugs into a wall outlet and then into the modem. There were a couple of flaws with this power supply: its transformer made a gentle but annoyingly continuous hum, and the connection between the power supply cable and the modem was a bit on the wobbly side.

When the modem is in use on the desktop, its sloping front panel makes it easy to access the four flat membrane switches and to see the LED indicators. Although the unit also has a full complement of DIP switches, these front panel switches do provide a quick way to control some important functions. There are separate switches to select answer and originate modes and one to set transmission speed, plus a handy warmboot switch that resets the modem.

The eight LEDs display the usual range of status information, with individual lights indicating data being sent or received, the transmission speed currently in use, the presence of a carrier, and so on.

The DIP switches are located on the back panel along with the jacks and on/off toggle. The DIP switch block is mounted flush with the panel, and the switches themselves are unusually large, so they can be readily set with your fingernail. There's a potential disadvantage in this arrangement, though: the switches are so easy to move that your setting might be altered in handling the modem or by backing the unit into something on your desk.

If you've had modest experience with the basics of Hayes-type modems, the documentation printed in outline form on the bottom of the modem should be enough for you. It lists the DIP switch options and Hayes commands, plus a summary of the register settings. Those who need more-complete documentation can turn to the extensive, well-written manual that accompanies the modem. In refreshingly readable English, the manual gives thorough, step-by-step instructions for everything from installation through advanced programming and troubleshooting, and it includes a helpful glossary. However, the instructions seem to say that you can simply type commands to the modem on your PC keyboard: they fail to mention the need to use special DOS commands or software when communicating through the serial port.

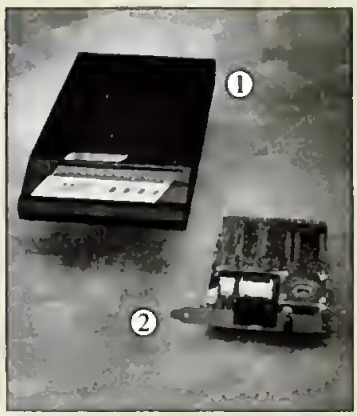
The Black Box Corp. may not be a giant among modem manufacturers, but the combination of quality documentation, solid performance, and an attractive design makes the Dial Modem 24 Plus a genuine competitor among 2,400-bps modems.

**HALF-CARD VERSION** The Black Box Half-Card Modem 2400 is the internal version of the Dial 24 Plus. Thanks to VLSI chips, this compact, well-constructed package slips easily into any available short slot. Factory configured to respond as COM2, the modem is strap selectable for COM1, COM2, COM3, or COM4. No other hardware adjustments are necessary. A built-in speaker lets you monitor the progress of the call. After you have installed the Half-Card Modem only the volume control dial and the two RJ-11 jacks are visible from the back of your computer.

The Half-Card Modem 2400 is compatible with the Hayes AT command set. All of the S registers are controlled by software (as opposed to DIP switches) and can be stored in nonvolatile memory. Call monitoring can be through the speaker or

## PC MAGAZINE FACT FILE

**Black Box Corp.**
P.O. Box 12800
Pittsburgh, PA 15241
(412) 746-5530




*Like most 2,400-bps modems, the Black Boxes performed better at 1,200 bps.*

① **Black Box Dial Modem 24 Plus**
**List Price:** $549
**Requires:** 25-pin serial cable. Phone cable and power supply included.
**In Short:** The Dial Modem 24 Plus offers excellent performance and a few advanced features—including push-button speed selection and MNP error correction—in an attractive package, and it comes with unusually helpful documentation.
CIRCLE **617** ON READER SERVICE CARD

② **Black Box Half-Card Modem 2400**
**List Price:** $595
**Requires:** Short slot.
**In Short:** A no-frills internal 2,400-bps half-card modem that functions well at 1,200 bps but had some problems with data transfers in PC Labs testing at 2,400 bps.
CIRCLE **618** ON READER SERVICE CARD

by using the extended command set. The modem has auto-dial auto-answer, a self-test mode, and automatic data rate fall-back.

In tests conducted by PC Labs to measure line noise resistance, the 2,400-bps Black Box modem performed very well at 1,200 bps, turning in good scores in both answer and originate modes on all three qualities of telephone line. This performance, along with the modem's space-saving tendencies and good Hayes compatibility, make it an expensive but solid modem when run at 1,200 bps.

Black Box markets a 1,200-bps version of the Half-Card, but no unit was provided for review.—**Chrlstopher Barr and Steve Cummings**

## Bytcom Inc.

The Bytcom 24/12 ADH is a good example of the cavalier way modem manufacturer's throw around the term *Hayes-compatible* these days. The Bytcom modem, made by CTS Corp. and also sold without the MNP option by Basic Time as the 2400E, supports the basic Hayes commands but cannot really be called Hayes compatible.

The Bytcom modem's lightweight plastic case encloses a modem that has no volume control. It comes from the factory with several default settings (contrary to EIA RS-232C standards, primarily carrier detect and clear to send always asserted) and no DIP switches or other hardware devices to correct them.

While software commands are available to change these settings to the normal RS-232C (and Hayes default) settings, it would be difficult for novices to realize that this was the reason that *Crosstalk* told them that they were already connected. Using this modem on a minicomputer would be an exercise in futility since you would have to program it while it was connected to a terminal or PC and then connect it to the minicomputer without disconnecting the power.

In fact, these problems prevented us from performing the full set of PC Labs modem tests. The tests we were able to perform indicated that the Bytcom modem performed poorly on telephone lines with any significant noise content.

My own use of the modem, which consisted of calls to several bulletin boards and MCI Mail nodes around the country, also showed the Bytcom to be sensitive to line noise since several garbled characters appeared on my screen.

The Bytcom has the normal complement of status LEDs, though it lacks an AA LED to show when the modem is in auto-answer mode. Its two telephone jacks are interchangeable, so you don't have to wonder why the phone doesn't work when the modem is turned off (a common indication that you have things plugged in to the wrong jacks on other modems).

The nicest thing about the Bytcom is its optional support for Microcom's public-domain MNP (Microcom network protocol) class 4. This protocol, like Xmodem and other software based protocols, divides the transmitted data into blocks, calculates a number that describes the data in the block, and retransmits those blocks that contain errors.

MNP has several advantages over Xmodem, however. In classes 4 and above, the data is sent between the two modems synchronously so that the start and stop bits needed for async transmission can be left out, saving 20 percent of the total number of bits to be sent. The size of the block is also adjusted according to the amount of line noise, so that efficient large blocks can be sent on clean lines and small blocks that take less time to retransmit can be sent on noisy ones. MNP, like any error-correcting protocol, requires that the modems at both ends support it. MNP can also be used for correcting errors in conversational communications, while Xmodem can be used only on file transfers.

A word of warning: combining protocols doesn't make for even more reliable transmission. If you are using MNP you shouldn't also use Xmodem since the different blocking methods may get you in a situation where the systems are forever retransmitting.

The Bytcom 24/12 ADH is an unimpressive modem with some Hayes incompatibilities. The addition of MNP, however, makes it worth at least some attention.
—**Howard Marks**

FACT FILE

**Bytcom Inc.**
2169 Francisco Blvd., Unit H
San Rafael, CA 94901
(800) 227-3254

*The 24/12 doesn't live up to the Hayes standard.*

**Bytcom 24/12 ADH**
**List Price:** $389.95
**Requires:** Serial port.
**In Short:** An unimpressive modem with some Hayes incompatibilities, but built-in MNP error correction makes it worth a look.

CIRCLE **542** ON READER SERVICE CARD

## Cermetek Microelectronics Inc.

Cermetek Microelectronics has been around for 15 years—first as a maker of custom chip sets, then, in the last 6 years, modems. We reviewed two of the company's products: the Cermetek 2400SPC internal 2,400-bit-per-second modem and the 1,200-bps Cermetek Security Modem. The 2400SPC proved to be a sturdy 2,400-bps modem, and the Security Modem is solid, even though it turned in an unimpressive performance in PC Labs testing.

Both modems are highly Hayes compatible and ran every AT-based software package thrown at them (*PC-Talk III*, *Crosstalk XVI*, *Qmodem*, and *Relay*

*Gold*). They dialed, redialed, recognized escape sequences, and returned online—all without a hitch. Both are far more intelligent than the average Hayes-compatible modem: instead of returning a simple No Carrier whenever a connection isn't made, more-descriptive phrases appear, including signals like Busy, Ringing, No Dial Tone, and Voice—a handy message that appears when somebody picks up at the other end of the line. Commas can be used in the middle of a phone number to recognize pauses during a call, or the "+" sign can be used to pause until a dial tone makes itself available on a phone line.

Cermetek's Security Modem is for business users who need to protect sensitive information on their PCs from unauthorized remote access. Locally, it has password protection to prevent unauthorized use for making outside calls. For example, if you type ATDT5551212 before dialing the number, it will come back with "USER ID:". If you don't enter the correct ID (the default password is coded in at the factory), the modem won't dial.

**AUDIT TRAIL** Remote users who call a Security Modem—connected system have to first enter a user ID, then the Security Modem tells them to hang up and calls them back at a predetermined number. Only then are they allowed into the system. The Security Modem can also set up an audit trail to catalogue all attempts to get into the system, as well as track all calls made locally with the Security Modem.

The modem stores up to 25 security user IDs and callback numbers in a buffer backed up by a lithium battery. In addition, 16 general-purpose numbers can be stored in the buffer. Cermetek built an extension of the AT command set into the Security Modem to control the modem's special features, so the numbers in the general-purpose buffer can be called by typing in ATD!*n*, in which *n* is a letter from A to P. The exclamation point tells the Security Modem to look for the number to dial in the general-purpose buffer. To alter user IDs and callback numbers in protected memory, you use the percent sign in place of the exclamation point.

Entering and changing numbers in the buffer and tailoring the level of security in the Security Modem can be done only by placing a key in a lock on the left front of the modem (Cermetek includes two keys with the Security Modem). The modem keeps an electronic imprint of the key in its memory. Once a key has been inserted, a user changes security levels for the modem by typing ATX followed by 0 or 3, in which 3 is security on and 0 is security off.

There are ten option switches on a DIP switch block behind the front panel of the modem. Options such as synchronous or asynchronous mode, auto-answer enable, and whether or not to return status codes to the connected terminal are controlled here. The tenth DIP switch is exceptional in that it controls whether or not to perform callbacks on the second jack in the back of the modem. This is important because another line, different from the first, can be connected to the modem for extra protection.

There are seven signals on the front of the Security Modem: TR (terminal ready), MR (modem ready), SD (sending data), RD (receiving data), HS (high speed), MC (modem check), and SM (for security features active).

The Security Modem is built like a tank, which is probably why it's backed by a 2-year warranty instead of 1 year, like the 2400SPC. I found out just how rugged it was when it got stuck in a New York subway car door during rush hour. The thick metal case held the door ajar while a few commuters squeezed through the crack. When I got home and turned it on, it worked fine.

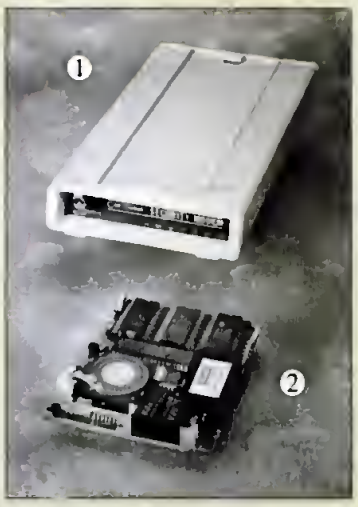
Unfortunately, all that armor couldn't help the Security Modem's disappointing results in PC Labs tests. On good and average phone lines it was among the modems least resistant to line noise, and on the poorest phone lines it crashed and burned, failing the test completely. These tests were administered before I took the Security Modem on its rough-and-tumble subway ride, by the way.

The manuals for both the 2400SPC and the Security Modem are well put together, illustrated with black-and-white photos, and both have a handy glossary. Regrettably, neither one has an index, and both need one. In addition, Cermetek should include a tutorial for the Security Modem because unless the instructions for its extensive security features are followed exactly as ordered at the AT command level, the modem will hang or become confused. The classical answer to a hung modem is to turn it off and turn it on again, but doing this only confused the Security Modem even more. After performing a reset sequence using Cermetek's key, I had no more problems.

The Security Modem is an interesting communications product that should find

PC MAGAZINE FACT FILE

**Cermetek Microelectronics Inc.**
1308 Borregas Ave.
Sunnyvale, CA 94088-3565
(800) 862-6271
(408) 752-5000




*Cermetek's modems are far more intelligent than the average Hayes-compatible product.*

① **Cermetek Security Modem**
**List Price:** $595
**Requires:** 256K RAM, serial card, cable, DOS 2.0 or later.
**In Short:** A 300/1,200-bps modem with password, callback, and key protection. Good for users who need extensive security.
CIRCLE 668 ON READER SERVICE CARD

② **Cermetek 2400SPC**
**List Price:** $445
**Requires:** 256K RAM, one half-slot, DOS 2.0 or later.
**In Short:** 300/1,200/2,400-bps internal half-card modem that works well. Good choice.
CIRCLE 669 ON READER SERVICE CARD

# PIE À LA ANY MODE.

HERCULES™ CGA EGA ENHANCED EGA

**Buy Sony's Multiscan™ Monitor and Paradise's AutoSwitch™ EGA 480 by June 30 and save a bundle. And get RIX's EGA Paint™ 2005, Free.***

If you want to have pie à la any mode, you have to have all the ingredients. And Sony and Paradise are offering you the best.

Starting with the incredible Sony Trinitron® Multiscan Monitor. It has the ability to lock automatically to any computer signal with horizontal scan rates between 15 and 34kHz and vertical scan rates between 50 and 100Hz. Serving up pies, or most any other graphic for that matter, in any mode from MDA to PGA.

What's more, the Sony Multiscan has the highest resolution rating (900x560) of any multiple scanning monitor, as well as the finest dot pitch (.26mm). Combine that with our world renowned Trinitron technology, and you won't believe your pies. Whether cherry red or blueberry blue, colors are deliciously rich.

So it's no wonder *PC Magazine* raves "where Sony distinguishes itself is in its wonderful display quality" and "in handling color."

PARADISE.

But without a great board, the results of our hot new Sony Monitor would only be half-baked.

That's why we're also offering the second vital ingredient. The remarkably advanced Paradise AutoSwitch EGA 480.

The AutoSwitch not only has the ability to switch software modes automatically, it also has an enhanced resolution of 640x480, 132 column capability and the Paradise software drivers for popular software packages.

Which is why *Personal Computing* says no other board "simplifies the mechanics and widens the choices as much." While *PC World* calls AutoSwitch "the most versatile EGA card on the market today."

And to sweeten the pie, we're giving away the RIX EGA Paint 2005 free. So call your Sony representative for this great value today. You'll not only have pie à la any mode, you'll have a PC graphics system that's the pièce de résistance.

## Sony Computer Peripherals

SONY. THE ONE AND ONLY.

**For more information on the Sony/Paradise bundle call:** Intelligent Products Marketing, Danville, CA (415) 820-8100; Intratec, Newport Beach, CA (714) 833-1315, Roy J. O'Donnel, Co., Denver, CO (303) 778-7575, Galaxy Sales Corp., Hialeah, FL (305) 620-7677; G/B Marketing Inc., Chicago, IL (312) 774-4500; Computer Products Marketing Inc., Newton Upper Falls, MA (617) 969-1152, RII Sales, Columbia, MD (301) 995-1816, Jay F Schude Associates, Ann Arbor, MI (313) 665-6222; Herold Associates, Eden Praire, MN (612) 944-1121; Technical Products Sales, Inc., Lincoln, NE (402) 475-2115; Computer Marketing Group, Leonia, NJ (201) 947-3551 Better Sales and Marketing, Rochester, NY (716) 385-7954, Sales Marketing Assoc., Columbus, OH (614) 464-1506, Harris Representatives, Portland, OR (503) 227-7740; BSA Sales Corp., Greenville, SC (803) 235-0291, Miller and Associates, Richardson, TX (214) 437-5733

*Actual savings may vary, as pricing is established by participating dealers. Free software available at participating dealers

© 1987 Sony Corporation of America. Sony, Trinitron, Multiscan, and The One and Only are trademarks of Sony. AutoSwitch is a trademark of Paradise Systems. EGA Paint is a trademark of RIX SoftWorks, Inc. Hercules is a trademark of Hercules Technology Inc. Quotes reprinted with permission from *PC Magazine*, January 13, 1987 © Ziff Communications Company. *Personal Computing*, September 1986 © Hayden Publishing Company, Inc. *PC World*, September 1986 © CW Communications/Inc. Because the computer industry lacks standards, Sony does not and cannot make any warranty or representation with respect to performance of its monitors with each and every software or hardware option.

fans among people who demand a high level of security.

**FAT WITH CHIPS** The 2400SPC is an intelligent half-card, heavy and fat with chips, and supports COM1 through COM4. You adjust the COM ports through a jumper block on the modem board and by flipping one DIP switch on a block facing out the back of the modem. Additionally, the 2400SPC has analog and digital loop testing, end-to-end testing for checking the quality of a connection, and dial tone testing. The 2400SPC recognizes both U.S. and European 2,400-bps specifications.

The Security Modem is built like a tank, which is probably why it comes with a 2-year warranty.

There are two modular jacks on the back of the modem, so you can have a telephone connected to the modem line as well. The speaker volume is below the RJ-11 jacks and the DIP switch block, facing out the back of your PC. It has to be adjusted with a small flathead screwdriver—an irritating task.

**HIGH TEST SCORES** The body of the modem is sturdy, and everything is soldered tightly. Cermetek doesn't lie when it says the 2400SPC is a half-card. The modem is heavy and feels like something lethal that Bruce Lee might send hurtling through the air toward a bad guy in a martial arts flick. The 2400SPC performed well in PC Labs phone line interference resistance tests. At 1,200 bps, it ranked near the top, proving only slightly less immune to line noise than the Hayes Smartmodem 2400B. At 2,400 bps, it finished near the Hayes in the middle of the pack.

I had no complaints with the 2400SPC's file transfer capabilities at home: it downloaded at a zippy pace with few retries. I had it dial a 300-bps modem at 2,400 bps, and it altered its carrier signal accordingly with no problem. I called the 2400SPC with a 300-bps modem and had it answer with 2,400 bps. Again, it altered its signal with similar elegance.

I do have one complaint that has less to do with the 2400SPC in general than the calibration of the unit I reviewed. I dutifully followed Cermetek's installation directions and found the board wouldn't fit in a slot in my XT where many boards had gone before. I pressed down firmly; still nothing. I pushed a little harder, still no go (it looks *so* easy in the pictures); finally, determined that man would yet again triumph over machine, I forced the board in there. The modem went in all right, but shaved off bits of whitish stuff from the board, making a mess all over my desk. I almost had a heart attack, thinking my motherboard was a goner.

I soon found that both the 2400SPC and my motherboard survived intact, but this prompted me to look up Cermetek's policy on inadvertent destruction of a user's equipment through the use of the company's products. Naturally, like most other computer peripheral manufacturers, it denies any liability.

**CLOSE CALL** Luckily, since my XT expansion slot was only widened a little, Cermetek can breathe easy. And I have to admit the 2400SPC still performed well after taking this kind of abuse.

This one shortcoming aside, the 2400SPC is a good modem at a price that's about average ($445) for the thrill of speeding along at 2,400 bps.

**—Chris Johnston**

## Code-A-Phone Corp.

You say you want the indicator lights and flexibility of an external modem but you don't want to clutter up your desk with another box? You say you want to be able to talk on the phone and send data at the same time? You say you want Hayes compatibility? Well, the Code-A-Phone Tel-A-Modem is for you.

Code-A-Phone, a long-time maker of telephones, answering machines, and other telephone accessories, has entered the modem market by building a 1,200-bit-per-second Hayes-compatible modem into a two-line desk phone. About the same size and shape as a standard desk phone, the Tel-A-Modem gives you all the standard features of an external modem, including indicator LEDs, without cluttering up your desk.

The Tel-A-Modem did show the compromises inherent in this design in its performance on the PC Labs tests, never reaching the zero error point on our worst-case line. Even at a 32-db signal-to-noise ratio, the Tel-A-Modem had garbled 15 characters out of the 10,000 transmitted. On the better lines, its performance was respectable but not outstanding, and it will probably work just fine for most people. The Tel-A-Modem did better in Hayes-compatibility tests, where it performed flawlessly.

PC MAGAZINE FACT FILE

**Code-A-Phone Corp.**
16261 Southeast 130th St.
Clackamas, OR 97015
(503) 655-8940

*The Tel-A-Modem combines a two-line telephone with a 1,200-bps modem.*

**Code-A-Phone Tel-A-Modem**
**List Price:** $495 to $595
**In Short:** A unique combination of two-line telephone and a 1,200-bps modem that takes up the space of only a desk phone.

CIRCLE **543** ON READER SERVICE CARD

# You bought WHAT paint program?

Don't feel like our friend here, get EGA PAINT 2005. If you're like most people you'd rather not spend ages learning a new program AND you want results... fast! Our 2005 version is not just another paint program or another version of the "same old thing". EGA PAINT 2005 is a complete restructuring of our 2001 program (itself the recipient of the PC TECH JOURNAL award for excellence in program design). We at RIX are not ones to stand on our laurels. We believe the end-user comes first and instead of merely patching on more features (as all the others do) we went to a whole new (much easier and faster) way to create truly startling business presentations & EGA color illustrations. Take a look at some of our new features (some of which are available only on programs costing hundreds more) and decide for yourself.

**HI-RES SUPPORT** – For those of you who have, or will get in the future, those EGA cards which support 640 X 480, 752 X 410 or 800 X 600, Version 2005 now supports these modes. (Note: a multiple scanning monitor is required to display these modes.)

**NEW COMMANDS** – For those engineers and architects using EGA PAINT we've added the GRID, ARC, and ELIPSE commands to make life a little easier. For the artist, we added AIRBRSH, SMOOTH (an automatic anti-aliasing command), and STRETCH. And for everyone, we included FULLPAGE so you can see and print a full page of graphics. FULLPAGE has a smooth vertical pan which gives you easy access to 640 X 622 pixels in EGA mode. FULLPAGE also supports all the previously mentioned HI-Res modes as well. In any supported mode, FULLPAGE screens print out an 8" X 10.67" area for your hard copy requirements.

**XLATE UTILITY** – This unique screen translation program comes with EGA PAINT 2005. XLATE allows you to convert your screens to any supported resolution you're working in. Example: an 640 X 350 EGA screen will convert to a 800 X 600 screen or vice-versa.

**EGA PRINT** – This capture screen structure is modified to allow you to name your screen before it is written to disk. EGA PRINT is now able to capture any kind of screen from any other program. You can even capture CGA and Text screens! EGA PAINT 2005 supports: IBM Graphics Printer, Hewlett Packard Laserjet +, Canon LaserJet LPB-8 A1/A2, Epson FX-XX & LQ-XXXX, NEC P-X Series (P5, P6, P9), Citizen MSP-10, MSP-20, Okidate ML-292, Toshiba 3XX (321, 341, 351), NEC P-X (Color), Sharp JX-70, Epson JX-80, Toshiba 351C, Xerox 4020, IBM Color & ColorJet printers, Okimate 20, and the Calcomp Color Master. Also, EGA PRINT supports black & white printing with all color units.

**EGA PAINT DEVICE SUPPORT** – EGA PAINT Version 2005 now supports the Polaroid Palette Plus, Summagraphics Summasketch Pads (both absolute & relative modes), as well as any Microsoft compatible mice.

**PC QUIK ART SUPPORT** – We realize not everyone is a Rembrandt but would still like to be able to make presentations on screen utilizing graphics along with their text or captured graphs from other programs. EGA PAINT Version 2005 now supports PC QUIK ART and their thousands of pre-drawn images for this purpose.

**ALL THIS AND MORE FOR JUST**

**$99.00**

($5.00 Shipping & Handling)

**ORDER NOW, TOLL-FREE**

1(800) 233-5983 (In California)
1(800) 345-9059 (Outside California)

We accept VISA & MASTERCARD

RIX

**RIX SoftWorks Inc.**

18552 MacArthur Blvd., Ste. 375 • Irvine, CA 92715
(714) 476-8266

CIRCLE 523 ON READER SERVICE CARD

# DESIGNER MODEMS

*In every genre, there are those who dare to be different. Modems are no exception.*

Most modems wouldn't win any awards for design. But of the 80-odd units we reviewed, a handful distinguish themselves with originality above and beyond the call of the Hayes Smartmodem standard.

The Eurostyle elegance of the Migent Pocket Modem is a case in point. With its smooth lines, slim size, and colorful bodywork, the Pocket Modem proves that hardware doesn't have to be boring.

The pared-down look is echoed by the cool white Prentice PopCom, which not only looks great but also blends in with the decor by hanging unobtrusively from a wall socket.

Less inspiring, but still interesting, is the stylistic diversion of Franklin Telecom's modem, with its sloping Concorde nose and slender profile.

Modems whose shape and styling follow the Hayes Smartmodem school of design can assert themselves in other ways. Front panels, for instance, run the gamut from the Darth Vader Tek-Com, with its two power-on and connection-made LEDs staring out from an expanse of black plastic, to the Telenetics ExpressData 24s, whose impressive collection of blinking lights and buttons make it look more like a Learjet cockpit than a modem.

Prometheus seems to prefer the TV-show game board approach—its Promodem 1200 features a front panel made of dark transparent plastic divided into squares. Make a call with this modem and you get to guess which square will light up next.

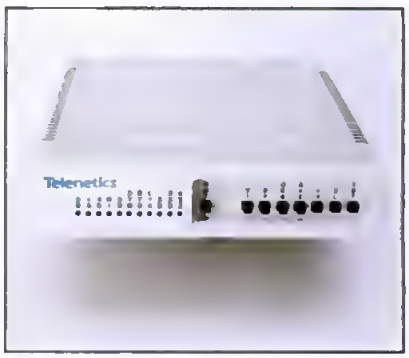
Meanwhile, the Cermetek Security Modem broadcasts its inviolability with a lock on the front panel.

Manufacturers who ignore such details as easily accessible speaker volume control and properly labeled telephone jacks could learn a lesson from a modem like the SmarTEAM 2400, whose well-labeled back panel includes two phone jacks, a volume control, and a good, sturdy power switch.

SmartTEAM, along with a few others, also proves that an internal modem doesn't have to drop from sight the moment you install it in your PC. The SmarTEAM 2400B half-card gives you both speaker control from *outside* the computer *and* exposed DIP switches, so you don't have to live your life governed by the settings you made when you first put the modem into your machine. Two (labeled) phone jacks, too.

Manuals have a way of disappearing the day after you've set up the hardware. Maybe this is why a few kind manufacturers have taken to printing vital information like DIP switch settings and Hayes AT commands on the bottom of their products. Among such considerate companies are Multi-Tech and Novation, whose external modems feature switch and command summaries.

—Nora Georgas




**Telenetics ExpressData 24s**

**Telenetics PonyExpress 24a**

**SmarTEAM 2400**

Photographs: Thom O'Connor

Tek-Com-212AD

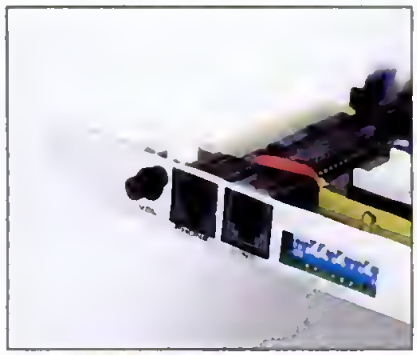
Multi-Tech MultiModem224EC

Migent Pocket Modem

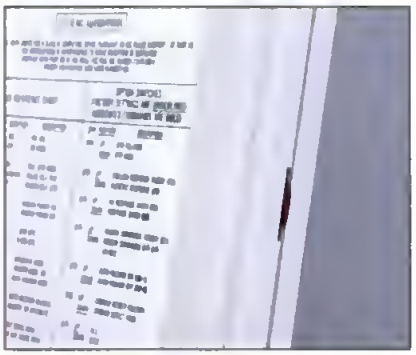
Prometheus ProModem 1200

Cermetek Security Modem

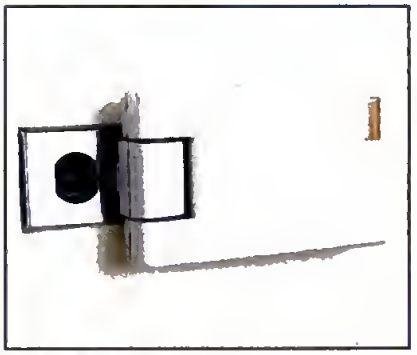
Franklin FM-2400E



SmarTEAM 2400B



Novation 1200 XE



Prentice PopCom X150

The Tel-A-Modem has the normal DIP switches to select the condition of the DTR, CTS, and CD lines on the RS-232 interface, as well as to set whether the modem should auto-answer incoming calls on line 2. There are indicator LEDs for carrier detect, transmitted data, received data, modem ready, and terminal ready, but not auto-answer or high speed.

The modem is connected to line 2, so you can set up the Tel-A-Modem to auto-answer without fear of your normal callers having their ears blasted off by the carrier.

As a telephone, the Tel-A-Modem includes such features as memory dial, hold, and call forwarding. In my consulting practice, I often find that I need to speak to a client and work on his computer with *Carbon Copy* at the same time. With the Tel-A-Modem, I could send data over line 2 and speak on line 1 without cluttering my desk with its normal complement of two phones and a modem.

Code-A-Phone has made a unique product that combines the virtues of an internal modem (less desk clutter) with those of an external modem (status LEDs) and throws in a perfectly good desk phone to boot. My suggestion to Code-A-Phone is to introduce a 2,400-bps version of the Tel-A-Modem and to improve its noise immunity. If these steps are taken the Tel-A-Modem could be a winner.

**—Howard Marks**

## Commodore Business Machines Inc.

You don't ordinarily find products with the Amiga label reviewed in *PC Magazine*. Once you get past the nameplate, though, it turns out that the Amiga Modem/1200 RS is a simple Hayes-compatible unit that works just as well with an IBM PC as it does with Commodore Business Machine's computers. In fact, Commodore is specifically targeting the product at the PC-compatible market, and it has bundled the Modem/1200 RS with *ProComm*, the increasingly popular shareware communications software package.

In every dimension, this is one of the smallest 1,200-bit-per-second modems you're going to find. At 3½ by 7 ½ by 1 inches, it's hardly bigger than a paperback book. To really minimize its footprint, the Modem/1200 RS comes with a stick-on bracket that lets you mount the device sideways on your PC's CPU. The design of the tan plastic case is as appealing as a simple box can be, though your PC chauvinism may be offended by the prominent Amiga logo.

This modem certainly wasn't designed with the telecommunications sophisticate in mind. Nary an indicator LED is in sight, so there aren't any blinking lights to distract you or arcane abbreviations to interpret. The Modem/1200 RS doesn't even have an on/off switch—a concession to simplicity that you may find extreme.

But the designers of the Modem/1200 RS gave into tradition when they got to DIP switches. There are eight of them, accessible through a port on one side (or the bottom, if you have the modem mounted on edge). Among the settings you can select with the DIP switches are whether auto-answer is enabled, whether verbal or numeric result codes are given by the modem, whether AT commands will be recognized, and whether the unit is connected to a single-line or multiple-line telephone system.

Phone and line RJ-11 jacks and a connector for the external power supply are located on the back of the Modem/1200 RS. Instead of a serial port, though, you'll find a hard-wired cable that terminates in an innovative two-faced connector with both male and female sides. Assuming your serial port has a standard 25-pin RS-232 connector, you're in business immediately, and you can forget any worries about gender identity. One telephone cable and the power supply are included with the unit.

**LEAN MACHINE** The Modem/1200RS features list is as spare as its exterior characteristics. Hayes compatibility is complete for the basic dialing commands and register settings, and you can run any of the standard communications software packages, but you won't find any extras. You can't change the volume of the speaker (which is too loud), there aren't any help screens, and you can't store telephone numbers or software configuration settings.

The Amiga modem's performance is adequate but not stellar. No problems were noticed in sample calls over real phone lines, but the unit scored below average in PC Labs tests of immunity to excessive telephone line noise. By the way, the modem is itself unusually noisy while on-line, sending out both a constant whistling sound and a rhythmic clicking over the line.

While brief, the user guide that accompanies the Modem/1200 RS is more complete than you might expect, with a lucid and reasonably thorough primer on the Hayes command set. Don't take offense at the photographs in the installation section, which show the modem being attached to an Amiga instead of a PC.

Of course, you can buy more-complicated modems than the Amiga Modem/1200 RS, and there are modems that

PC MAGAZINE FACT FILE

**Commodore Business Machines Inc.**
1200 Wilson Dr.
West Chester, PA 19380
(215) 431-9100

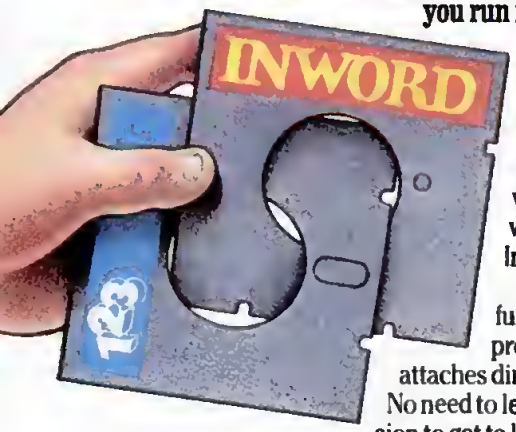
*You needn't fear the Amiga nameplate on this small, well-designed modem.*

**Commodore Amiga Modem/1200 RS**
**List Price:** $295
**Requires:** Serial port.
**In Short:** Commodore is betting that the small, attractive design of the Amiga Modem/1200 RS may tip the balance in its favor for some users, even though its performance is only average.

CIRCLE 467 ON READER SERVICE CARD

# Now there's a real word processor that's just as attached to 1-2-3 as you are.

**Introducing InWord. The complete word processor you run from inside 1-2-3.**




Now, for everyone who's ever formed a meaningful relationship with 1-2-3,® we offer a single word of advice—InWord.™

It's the full-fledged, full-function word processor that attaches directly to Lotus 1-2-3. No need to leave your 1-2-3 session to get to InWord. No need to leave InWord to get back to 1-2-3.

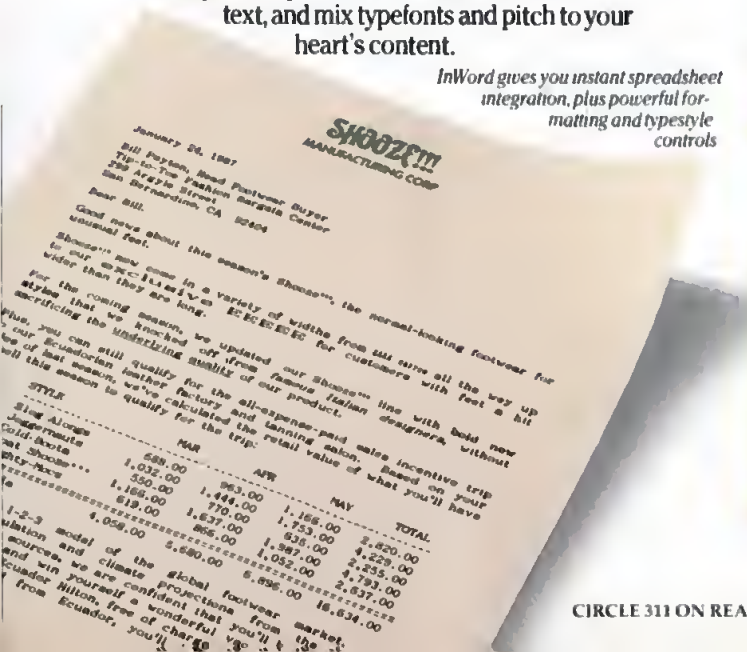
Best of all, InWord works wonders with your words in the same way 1-2-3 helps master your math.

**Take full command of the language.**

InWord is equipped with the kind of speed and performance that anyone could fall for. You get automatic word wrap and paragraph reform, horizontal scrolling, search and replace, cut and paste, cursor movement by word, sentence or paragraph. And there's more.

You can format your document with headers, footers, page numbers, tab stops, indents, and hanging indents. As well as left, right, center and full justification.

Plus you can print bold, underlined and italic text, and mix typefonts and pitch to your heart's content.




*InWord gives you instant spreadsheet integration, plus powerful formatting and typestyle controls*

**It's great to be connected with Lotus.**

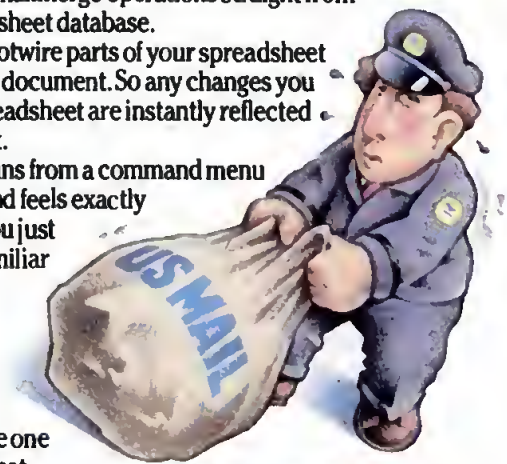
It's no coincidence that InWord gets along so beautifully with 1-2-3. In fact, InWord was developed especially for 1-2-3 Version 2 using software tools supplied by Lotus® themselves.

That means InWord is truly integrated with 1-2-3. So it's a breeze to transfer data directly from a spreadsheet to a document, or the other way around. And a snap to do lightning-like mailmerge operations straight from your 1-2-3 spreadsheet database.

You can even hotwire parts of your spreadsheet directly into your document. So any changes you make to your spreadsheet are instantly reflected in your document.

Plus, InWord runs from a command menu that looks, acts and feels exactly like 1-2-3 itself. You just can't get more familiar than that.

So if you've become hopelessly attached to the 1-2-3 habit, insist on the one word processor that shares your affection. InWord. It's from the makers of Sideways, the world's leading 1-2-3 spreadsheet printing software.




*With InWord, automatic mailmerge is as easy as selecting a range from your 1-2-3 spreadsheet database.*

See InWord at better computer dealers everywhere. Or order direct from Funk Software with your check, Visa or MasterCard. At just $99.95 a copy, InWord could be the last word you'll ever need.

**FUNK SOFT WARE**

## INWORD

I'm hooked. Please send me _____ copies of InWord at just $99.95 each.

☐ My check is enclosed. Charge my _____ Visa _____ MasterCard

Account number _____ Exp date _____

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

**To order call 1-800-822-3865**

(617-497-6339 in MA)

Requires 1-2-3 Version 2. Will **not** run with Version 1 or 1A.

Funk Software, 222 Third Street, Cambridge, MA 02142

© 1987 Funk Software. InWord is a trademark of Funk Software.

CIRCLE 311 ON READER SERVICE CARD

perform better on very poor phone lines. But if you need a modem for telecommunications basics like BBS connections or e-mail duties, and if simplicity and desk space are priorities, you won't go wrong with the Amiga Modem/1200 RS.
—**Steve Cummings**

## Dowty Information Systems

As its full name implies, the Dowty Quattro V.22bis International Modem is a cosmopolitan's delight. The Quattro can conduct its business using any of four Bell transmission protocols (for communications in the United States) and four CCITT protocols (for international links), and it supports both asynchronous and synchronous modes. With so many protocols in its repertoire, the Quattro should be able to talk to just about any 300-, 1,200-, or 2,400-bit-per-second modem you're likely to run into.

But a potpourri of signaling protocols is only the start of the wealth of features that the Quattro offers. You can have the modem dial repeatedly until it gets an answer or dial a second number if the first is unresponsive. Two flavors of hardware error correction are supplied, including the standard MNP scheme and a proprietary variant called SureLink. There's also a sophisticated automatic log-on capability that can dial a host system or bulletin board and then send a complex sequence of passwords and responses to other prompts, such as required to log on—all with a single command.

You can configure the Quattro modem entirely through software, and a screen showing the current settings of the configuration parameters is always available. The configuration settings and your automatic log-on sequence are stored in the Quattro's relatively generous memory space, where they'll remain until you change them, even if the modem is turned off. This nonvolatile memory also has room for up to 20 18-digit telephone numbers that you can save for quick dialing; as you'd expect, you can view a screen directory of all the stored numbers.

The Quattro supports all the basic Hayes commands, and these are supplemented by many additional AT-format commands that give access to the new features. Three terse but complete help-screen listings of the commands can be called up from the modem at any time.

According to PC Labs tests for immunity to line noise, Quattro performed very well but didn't quite match the best modems under all conditions. The biggest discrepancy between the Quattro and the leaders came at 2,400 bps on one type of noisy line, where only six other units made poorer showings.

**DOWDY CASE** With all that power under the hood, it's a shame that the Quattro doesn't quite look the part. The manufacturer, Dowty Information Systems, has designed an almost, well, dowdy modem. The unit is housed in a simple gray metal case and, besides looking ungainly, it is noticeably longer, taller, and wider than most of the competition.

A potpourri of signaling protocols is only the start of the wealth of features that the Quattro offers.

Aesthetics aside, there's little else to criticize about the physical characteristics of the modem. The unit comes with a built-in power supply, so you won't have to worry about losing or breaking a separate transformer. At the back panel, the RJ-11 jacks, serial port, and an auxiliary control port for synchronous applications are clearly labeled, and there's a grounding lug just in case you need it.

Conspicuous by their absence on the Quattro are DIP switches. Because the configuration set through software is retained while the modem is powered down, there's simply no need for them. If you do like the manual approach, however, there are six multiple-function buttons on the front panel that let you quickly select from several predefined configurations. When you're not reconfiguring the Quattro, the buttons can initiate other tasks, such as the dialing of stored phone numbers or the performance of a variety of diagnostic tests. Also on the front panel are six LED indicators for the typical array of line conditions, including the off-hook status, the presence of a carrier, and data being sent or received.

The manual shipped with the Quattro is inelegant but comprehensive. There's ample coverage of such advanced topics as the various Bell and CCITT protocols, synchronous versus asynchronous operation, and error-correcting modes.

The Quattro's extensive array of fea-

PC MAGAZINE FACT FILE

**Dowty Information Systems**
Powerville Rd.
Boonton, NJ 07005
(201) 334-3100

*The Quattro modem can remember up to 20 18-digit phone numbers.*

**Dowty Quattro V.22bis International Modem**
**List Price:** $780
**Requires:** 25-pin serial cable (one phone cable is supplied).
**In Short:** What the Quattro lacks in styling, it makes up in an abundance of useful advanced features and support for a host of communications protocols. If flexible programmability or international compatibility are key, this modem is a good choice.

CIRCLE 679 ON READER SERVICE CARD

# What's friendly, powerful and remembers everything about your 1-2-3 spreadsheets?

*With Noteworthy, neither you nor others who use your spreadsheets need ever forget the true meaning of a cell.*

### It's a jungle in there.

Let's face it. Some of your spreadsheets can be real beasts-with tons of formulas, assumptions, and complex interrelations between cells.

It's tough enough trying to remember your own reasons for doing things. Worse yet, try explaining it all to someone else.

### Introducing Noteworthy – The professional spreadsheet annotator.

Now, thanks to new Noteworthy,™ it's easy to tame the most gigantic spreadsheets in creation. That's because Noteworthy is the first software ever to combine a majestic power for spreadsheet annotation with a gentle, cooperative nature.

Plus, it works alongside 1-2-3® in a way that no software has ever done before.

Want to remember why you put what you put in a cell? Just hit the hot-key and up pops a blank note. Then type away using Noteworthy's powerful built-in editor (it will remind you a lot of a full-featured word processor).

Create single notes up to 8,000 characters long. Make as many notes as you need, in a window of any size you choose, positioned on the screen where you want. Copy text from your note to a spreadsheet. From your spreadsheet to a note. Or from one note to another. Find and replace words and phrases automatically, in single notes, or throughout the spreadsheet.

Noteworthy even reminds you where you put your notes. Each time the cursor lands on an annotated cell, the note indicator lights up at the bottom of the screen.

### Big news for heavy 1-2-3 users.

Despite its awesome power, Noteworthy is fast and reliable. That's because it doesn't lumber along in the background like some RAM resident utility. Instead, it runs as a bona-fide 1-2-3 add-in. In fact, Noteworthy was specially developed using new software tools supplied by Lotus® themselves.

That means true integration between 1-2-3 and Noteworthy. No clumsy interference with the keyboard or with background programs like SideKick.® And it consumes less than 50K, which means it virtually runs on peanuts.

So why burden yourself with the details of your spreadsheets, or with annotation software that doesn't pull its weight? Just remember Noteworthy. And you can forget everything else.

Look for Noteworthy at computer dealers on several continents. Or avoid the stampede and order direct from Funk Software with your check, Visa or MasterCard.

**FUNK SOFT WARE**

**Noteworthy™**

**For spreadsheets worth noting.**

Please! Before I forget, send _____ copies of Noteworthy at $79.95 each.

☐ My check is enclosed. Charge my _____ Visa _____ MasterCard

Account number _____ Exp date _____

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

**To order call 1-800-822-3865**

(617-497-6339 in MA)

Requires 1-2-3 Version 2 or Symphony®. Will not run with 1-2-3 Version 1 or 1A

CIRCLE 315 ON READER SERVICE CARD

Funk Software, 222 Third Street, Cambridge, MA 02142

© 1987 Funk Software. Noteworthy is a trademark of Funk Software.

tures may be overkill for most people, but many will appreciate its international communications capabilities, built-in error checking, and AT command extensions. Besides, the Quattro is priced competitively with some less versatile modems, and it may be worth a look even if you don't need the extra features just now.
**—Steve Cummings**

## EMP Memory Products

This 300/1,200-bit-per-second modem is a Hong Kong-made economy model, and it looks the part. The EMP company label and the product name Automodem 1200HC, appear to be pasted down by hand as if the unit used to bear another company's logo. In fact, it did. The nicely produced manual (which, strangely, came with its front cover and first page razored out) makes reference to "maintaining your Avatex 1200hc modem."

The unit was originally made by Avatex. The manual has a photo of the EMP Automodem 1200HC that doesn't look like what comes out of the box. The case is different. The shapes of the LEDs and the push buttons on the front panel are different. And the modem in the photo is labeled Avatex 1200hc.

The modem's case is shock-resistant plastic, about the size of the Smartmodem 1200, but it lacks any styling. The front panel contains a row of eight LEDs and three on/off push buttons that control power to the unit and toggle the modem between data or voice communications and 300- or 1,200-bit-per-second operation. The LEDs indicate the status of power to the unit, data terminal ready, data being transmitted, data being received, low or high speed, on/off line, test mode, and incoming phone call.

The installation procedure is extremely well documented, so that even first-time users should have no problems with the hardware end of things. First, you check the positions of the DIP switches on the rear panel of the modem and set all eight according to the suggested defaults, which are the standard settings used in most modem configurations. Indeed, these settings worked fine in my testing. Next, you plug in the RS-232 cable. Finally, you connect the phone line jack coming from the modem to the wall phone outlet and then optionally connect the telephone line jack into the rear panel of the modem so that you may use the phone for conversation when the modem is not on-line.

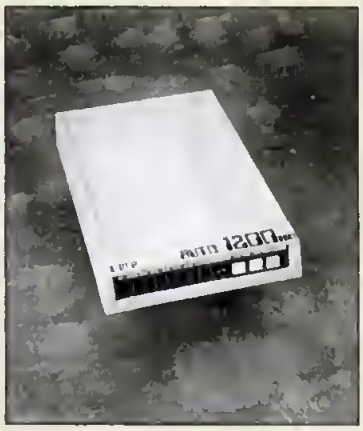
Installation took me about 2 minutes, but I decided to read the manual before booting my standard communications programs. Immediately following the installation instructions is a section on loading your communications software program. On the next four pages are simple BASIC programs for Apple, Atari, and IBM that will get you on-line even if you have no communications software. Nothing fancy, mind you, but at least you have a place to start when you bring home the box. I found this a thoughtful touch, considering the number of people who purchase modems without realizing that a communications program will also be needed.

The manual proceeds with sections on how to initiate or answer a phone call, manually or automatically; how to autodial for voice contact; testing the modem (a good number of tests were included to simulate many on-line situations); programming the modem's S registers, an alphabetical listing of commands, meanings, and functions; and a handful of very useful appendixes. All this excellent documentation with no front cover!

The modem is completely Hayes compatible and did not refuse to respond to any of the command set. It also performed flawlessly at both 300 and 1,200 bps in my own testing under normal daily conditions. However, the PC Labs test results indicate one of the poorest tolerances for noise among the 1,200-bps modems. It looks inexpensive; it acts inexpensive; it is inexpensive.**—Phil Wiswell**

PC MAGAZINE FACT FILE

**EMP Memory Products**
2250 Midland Ave., Unit 26
Scarborough, Ontario, Canada M1P 4R9
(416) 298-9388



*The Automodem 1200HC is inexpensive; unfortunately, this modem looks and acts the part.*

**EMP Automodem 1200HC**
**List Price:** $250
**Requires:** RS-232 cable.
**In Short:** An inexpensive modem with good documentation and features but poor resistance to line noise.

CIRCLE 614 ON READER SERVICE CARD

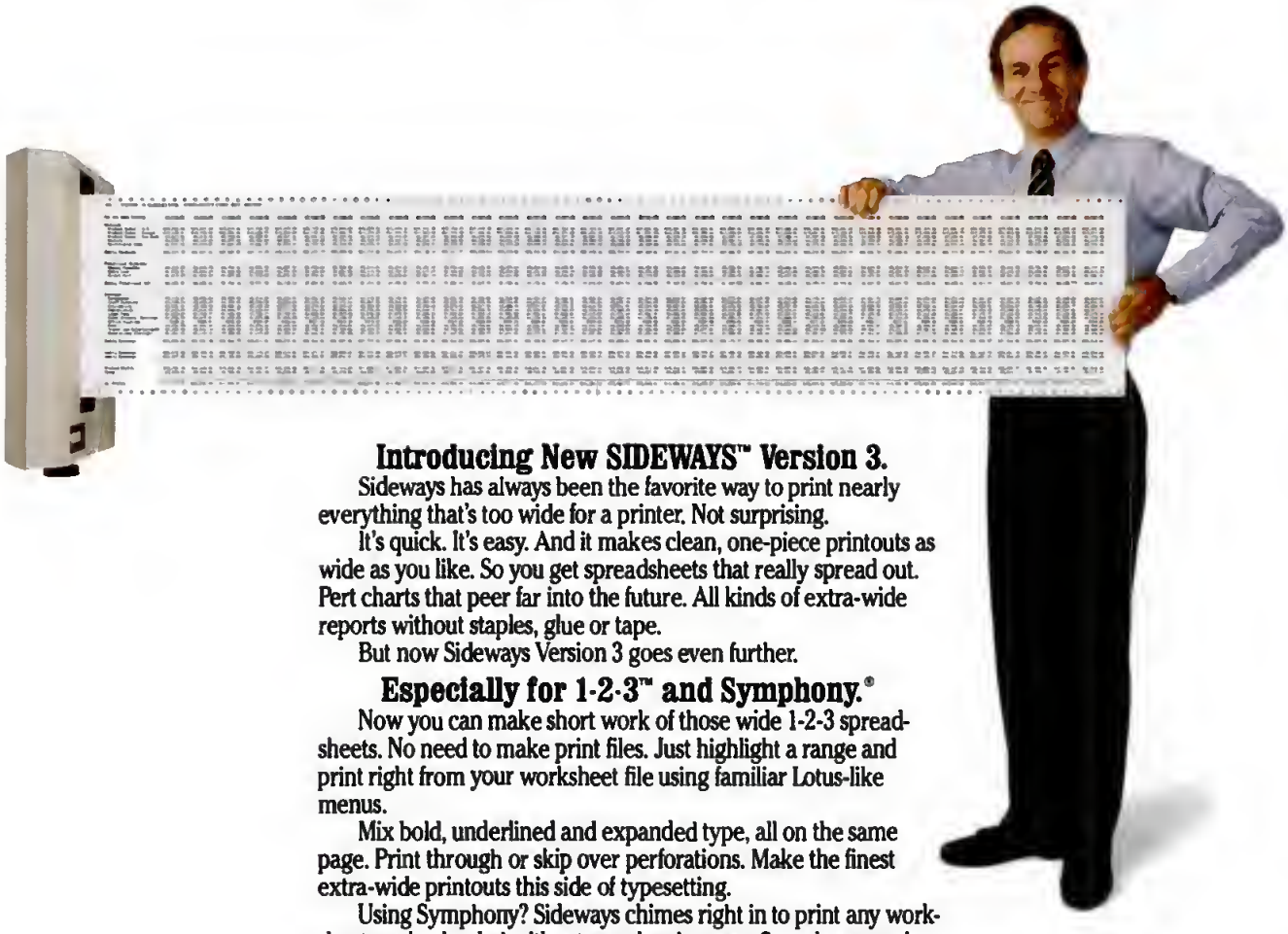
## Fastcomm Data Corp.

For most people and modems, high speed means 2,400, 4,800, or 9,600 bits per second. But the Fastcomm 2496T turbo series looks at those speeds with only a backward glance. This internal and external modem pair will happily churn data across the dial-up telephone network at 19,200 bps, complete with built-in error checking. Of course, more sedate rates of data exchange from 300 bps and up are also available.

Those capabilities fit into two very compact packages: a 1½- by 6- by 9½-inch external modem priced at $1,099 that will quietly nap under a standard (Western Electric Model 500) telephone desk set, and a 5-inch short card, at $1,079, that uses the 8-bit XT bus and will fit any expansion slot in any full-size IBM personal computer.

Such high-speed modems are not new for Fastcomm Data Corp.'s parent company, Electronic Vaults, which claims to have introduced the first dial-up 9,600-bps modem in April 1985. The company's first product, the Upta 9600 modem, was created as part of a larger corporate project, one that still remains under development and under a cloak of secrecy. Fastcomm was created in May 1986 to handle modems

# We've gone to great widths to make you look good.



## Introducing New SIDEWAYS™ Version 3.

Sideways has always been the favorite way to print nearly everything that's too wide for a printer. Not surprising.

It's quick. It's easy. And it makes clean, one-piece printouts as wide as you like. So you get spreadsheets that really spread out. Pert charts that peer far into the future. All kinds of extra-wide reports without staples, glue or tape.

But now Sideways Version 3 goes even further.

## Especially for 1-2-3™ and Symphony.®

Now you can make short work of those wide 1-2-3 spreadsheets. No need to make print files. Just highlight a range and print right from your worksheet file using familiar Lotus-like menus.

Mix bold, underlined and expanded type, all on the same page. Print through or skip over perforations. Make the finest extra-wide printouts this side of typesetting.

Using Symphony? Sideways chimes right in to print any worksheet you've loaded without ever leaving your Symphony session.

## No matter what software you use.

Spreadsheets, databases, word processors, project planners. Whatever you use, you'll get more out of new Sideways.

Choose from nine different type sizes, from "minuscule" to "mammoth." Print bold, underlined or expanded – whatever your software can create. Even foreign language and line-drawing characters. Plus, there are so many ways to adjust margins, spacing and page size, it stretches the imagination.

Sideways Version 3 for the IBM® PC and all popular dot-matrix printers. Available now at computer dealers nationwide. Or directly from Funk Software with your check, Visa or Mastercard.

At just $69.95 a copy, you'll never want for width again.

Funk Software, 222 Third Street, Cambridge, MA 02142. Phone (617) 497-6339.

© 1986, Funk Software, Inc. Sideways is a registered trademark of Funk Software. Lotus, 1-2-3 and Symphony are registered trademarks of Lotus Development Corp.

CIRCLE 317 ON READER SERVICE CARD

and leave Electronic Vaults to deal with the development of the larger system.

Apart from packaging restraints, the two Fastcomm 2496T modems are quite similar. Both are based on Rockwell International's high-speed chip sets—one set for speeds of 2,400 bps and below, and a separate group of chips for 4,800 bps and above. Each of these chip sets is installed on its own daughtercard, and the board bearing the high-speed trio of chips is labeled as being made by Rockwell itself.

This super-speed subassembly can be field-installed later into the lower-priced Fastcomm 2,400 series of modems, giving you the option of buying a modem that achieves today's high-speed standard and eventually upgrading to 19,200 bps, should the CCITT V.29 specification become the accepted standard. Alternatively, the lower-speed chips can be installed in Fastcomm's 9,600-bps products.

The Turbo circuitry is actually ancillary to the 9,600-bps section of the Fastcomm modems and can be added to a non-Turbo Fastcomm 2496 with a field installation kit. Doubling the speed adds only a $100 premium to the price of either the internal or external product.

**NOT JUST A COPY** The external model of the Fastcomm 2496T resembles the Hayes series of external Smartmodems but does not copy them. Its shell is beige molded plastic with inset gray front and rear panels. Power is derived from a large black 20-watt transformer brick—about the size of that used by the PC*jr*—that plugs directly into a wall outlet.

The front panel of the 2496T external unit is decorated for light-show aficionados with the requisite array of LEDs to indicate modem functions. These indications include modem ready (which works out to be little more than power on), off hook, carrier detect, receive data, send data, and conditions of the RS-232 connection—request to send (RTS), terminal ready (DTR), and clear to send (CTS). A small plastic front-panel knob (about ⅛ inch in diameter) adjusts the volume of the internal loudspeaker.

On the rear are the RS-232 connector (DB-25 female), a rocker switch for power, a connector for the external power supply, and a single telephone jack (you will need a wye-cable or separate telephone jack to connect up the 2496 external).

The internal version, the Fastcomm 2496T-B, is a double-deck board, the upper layer being the two Rockwell chip daughtercards. No indicators are available, and it lacks a loudspeaker. You'll have to have faith in the on-screen progress reports and messages to know what's happening on the phone line. There just isn't room in a short slot for 19,200 bits and a speaker, too.

Aside from those construction details, the two Fastcomm modems are functionally identical. Both are full-featured and offer the convenience of auto-dial, auto-answer, auto-redial, and automatic detection of the data rate. Both recognize a superset of the Hayes AT command set: their advanced features are accessible by their own proprietary commands, which work like standard AT commands. They are compatible with normal Hayes commands, including extended result codes (which they further extend).

The default configuration at power-on can be software adjusted and is stored in nonvolatile memory. Both modems use a single bank of four DIP switches to limit access to this nonvolatile memory. Although this switch is accessible through the retaining bracket of the internal modem, you'll have to disassemble the external unit to flick the switches.

At 300 bps, the Fastcomm modems follow the Bell 103 standard; at 1,200 bps, 212A; at 2,400 bps, CCITT V.22 bis; and at faster speeds, CCITT V.29. To stretch the V.29 standard to 19,200 bps, the Fastcomm modems use a 32-bit CRC (cyclic redundancy code) instead of the more usual 16-bit, according to the company.

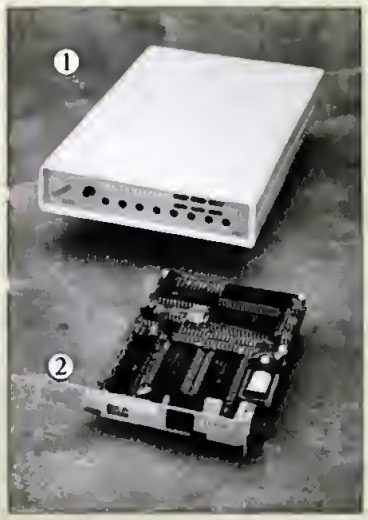
Unlike the high-speed Hayes modem, modems in the Fastcomm series do not function synchronously; but because most people will be using an IBM-style asynchronous adapter to connect to these products, that lack should not be a serious limitation.

**ERROR-CHECKING SCHEME** At speeds of 4,800 bps and greater, the Fastcomm modems use the EDI (ensured data integrity) error-detection protocol. This error checking is completely internal, invisible to your PC (and you) and cannot be defeated. Because this error-correction algorithm is proprietary to Fastcomm, these modems can communicate only to other Fastcomm modems at speeds of 4,800 bps and higher. (Speeds up to 2,400 bps are fully compatible with other modems.)

Fastcomm wisely recommends that you do not use a software-based error-checking

## PC MAGAZINE FACT FILE

**Fastcomm Data Corp.**
12345-E Sunrise Valley Dr.
Reston, VA 22091
(703) 620-3900




*Fastcomm's 2496T modems operate at speeds up to 19,200 bps.*

① **Fastcomm 2496T**
**List Price:** $1,099
**Requires:** Serial port, complementary modem at speeds of 4,800 bps or more.
**In Short:** A very-high-speed dial-up external modem that operates at most speeds from 300 to 19,200 bps and is fully Hayes compatible.
CIRCLE **653** ON READER SERVICE CARD

② **Fastcomm 2496T-B**
**List Price:** $1,079
**Requires:** Serial port, complementary modem at speeds of 4,800 bps or more.
**In Short:** A very-high-speed dial-up internal modem that operates at most speeds from 300 to 19,200 bps and is fully Hayes compatible.
CIRCLE **652** ON READER SERVICE CARD

scheme (such as Xmodem) at speeds of 4,800 bps and beyond because such techniques will greatly degrade communications throughput.

In normal operation, the Fastcomm modems will try to operate at their top speed where possible, seeking out a 19,200-bps connection with another Fastcomm modem at the other end of the line. They will fall back to the highest speed that a given connection will support, from 9,600 to 7,200 to 4,800 to slower speeds.

In case you hadn't noticed, 19,200 bps is twice as fast as IBM's maximum documented operating speed for an asynchronous port. To sidestep that barrier, Fastcomm includes *Qmodem* software with both 2496T modems. This terminal emulation program allows any PC to communicate with the 2496T at the modem's highest speed.

At more normal speeds in PC Labs tests, the Fastcomm modems performed well, in the top strata of all the products tested at both 1,200 and 2,400 bps.

The Fastcomm products give you an unusual measure of versatility. You can start with a single purpose product—high- or low-speed—and then upgrade to add extra features. Priced at the level of other premium products like Hayes Smartmodems, these are the modems to choose when you need high speed or are uncertain about your future telecommunications requirements.—**Winn L. Rosch**

## Franklin Telecommunication Corp.

Housed in a somewhat oversized light gray case, Franklin Telecommunication Corp.'s FM-2400E, which is manufactured by Micom Systems, looks like a competently built, high-end product. The 2,400-bit-per-second external modem's 6- by 11- by 1⅜-inch measurements make it a hog for desk space, but the extra length is needed to accommodate a sloping control panel featuring a bank of eight status indicator lights and four soft-touch switches.

The bright, easily seen indicator lights serve two purposes: they report on the modem's communication status, and they flash as the modem goes through a self-test every time it's turned on. If the test finds any problem, the transmit (TR) light continues to flash, warning the user that something is wrong. The four switches let you originate a call when the modem is off hook, answer a call, select communications speed, or reset the modem.

**FEATURES** The back of the modem features a female RS-232 connector, a bank of eight DIP switches, two clearly marked phone jacks, the connection for the power cord, and a small on/off toggle switch. Franklin supplies a power transformer and a phone cable with the modem. The user is expected to supply the cable connecting the modem to the computer.

Inside, the modem's construction is disappointing and not in keeping with Franklin's claim that this is a high-end product at a competitive price. The wrinkled foil traces may be acceptable, but a thick gob of plastic on one corner of the circuit board, apparent inconsistency in covering the circuit traces with plastic, and a big, clunky metal heat sink along one side did not inspire confidence.

On the plus side, the placement and soldering of parts was neat and competently done. The board looked like it could withstand a few plunges from desktop height.

**PERFORMANCE** The modem performed well, initially. Setup took less than 5 minutes, consisting mainly of setting the DIP switches and plugging the modem in.

The process was helped along by a well-illustrated user's guide. The guide is logically divided into basic and advanced sections, technical appendixes, and a glossary. The text assumes no previous knowledge on the part of the modem's purchaser and takes the trouble to explain not only what to do but why it's done.

The FM-2400E's user's guide is not the complete idiot's guide to data communications, but it is a much better document than is usually provided by PC and PC peripheral vendors.

In subjective performance tests, the modem was stepped through a representative series of standard Hayes commands. It showed no incompatibilities at any of the rated speeds: 300, 1,200, and 2,400.

Running the modem with *Crosstalk XVI*, *Smartcom II* and *PC-Talk III* showed no apparent incompatibility. It also showed no particular problem in handling file transfers over some rather noisy long-distance service lines. In line-noise resistance tests, however, the modem turned in only average results.

In the end, it was that clunky heat sink that ruined the FM-2400E. Left on overnight (approximately 8 to 9 hours), the modem greeted the dawn with the stench of charbroiled plastic. The inside of the case showed black scorch marks on both the lid and one corner of the control panel's circuit board. The scorching did not affect the operation of the modem, but who wants to be asphyxiated while transmitting files?

As a company with experience in manufacturing and marketing PC storage sub-

PC MAGAZINE FACT FILE

**Franklin Telecommunication Corp**
733 Lakefield Rd.
Westlake Village, CA 91361
(818) 706-1186

*The Franklin FM-2400E has design problems that can lead to overheating.*

**Franklin FM-2400E**
**List Price:** $460
**Requires:** RS-232 cable.
**In Short:** A 2,400-bps, full-featured external modem suffering from sloppy manufacturing and poor placement of a heat sink, which causes the unit to overheat with *un*pleasant results.

CIRCLE **645** ON READER SERVICE CARD

systems and other peripherals since 1981, Franklin Telecommunication really could have picked a better modem to market.
—**Walt Rowinsky**

## Fujitsu America Inc.

Fujitsu America's 1,200/2,400-bit-per-second external modem offers a full array of features for telecommunications at a price that's reasonable. It has automatic dialing and answering, handles synchronous or asynchronous data transmission, may use tone or pulse dialing, and supports full- and half-duplex protocols. With an optional daughterboard installed (M35-DAA), the modem becomes compatible with the Hayes AT command set.

Installation is straightforward, requiring only two pages of the manual for a full explanation. All you need to do is plug the transformer into the modem and wall and plug in your phone and/or line jacks and RS-232 cable to the rear panel of the modem. My only confusion in learning to set up and use this modem came from not finding its power switch. It doesn't have one! This leaves you with three options: either you leave the modem turned on all the time, or you plug it in and out of the wall when you want to use it, or you buy a switch box that lets you turn the modem on and off without getting up. None of these solutions is satisfactory for my working environment. I'd buy a modem with a power switch before I bought one that required me to also buy some kind of switch box. Of course, if you already own a device that can turn individual power outlets on and off, this design oversight doesn't really matter.

My only other complaint about the Fujitsu M1935D's design concerns its plastic case. Yes, it's very shock resistant, and it is an attractive device whose color scheme matches that of the PC. However, it has heat vents on the top of the case, as well as the bottom and sides, which means you can't set your phone on top of the modem as you would normally do. Desk space being at a premium, it's annoying not to be able to use this arrangement. But you won't want to risk overheating problems.

The modem's front panel sports 11 LED status indicators and seven two-position push buttons. Most of the 11 LEDs communicate the expected information to the user—ready to transmit or send data, incoming call, carrier status, data transmission status, and operating speed—and two are used in conjunction with the modem's built-in self-test. Four of the seven push buttons are also used for testing the modem's operation and connections; the other three toggle the modem between voice or data communication, originate or answer mode, and 1,200- or 2,400-bps operation. All functions of the front panel are useful and well thought out.

**OPTIONAL DAUGHTERBOARD** The optional M25-DAA daughterboard for the modem enhances the automatic dialing and answering features by adding support for the Hayes AT command set (in testing, all Hayes commands were recognized), a display of your connection time, writing/reading of the S registers to nonvolatile memory, and storage of up to 31 phone numbers and names. Automatic dialing may be done by selecting either the number or name from a list. I wholeheartedly recommend this option; without it, your Fujitsu is just another 2,400-bps modem.

The 35-page manual is one of the best I've seen for modem hardware. It is well written, and there is a section near the back for beginners who need to brush up on the telecommunications terminology used throughout the manual. Everything is well explained, with tables for the DIP switches, S register configurations, and command results, schematic diagrams, and even photographs of the front panel, rear panel, and inside the cover.

At 1,200 bps, the M1935D did extremely well in the PC Labs noise tests, with scores in the top 10 percent. At 2,400-bps it did less well with middle-of-the-road scores. Still, I experienced no problems using the modem at 1,200 or 2,400 bps from what I consider a noisy residential phone.

In light of its ability to communicate reliably at both speeds, its excellent front-panel interface, and the extended features added by the daughterboard, the M1935D is an excellent choice for 1,200/2,400-bps operation. But don't overlook the potential frustration that its lack of a simple power switch will bring you in everyday use. After all, how much money can Fujitsu be saving the consumer by not including the switch?—**Phil Wiswell**

PC MAGAZINE FACT FILE

**Fujitsu America Inc.**
Data Products Division
3055 Orchard Dr.
San Jose, CA 95134
(408) 946-8777

*One interesting omission on Fujitsu's modem: there's no power switch.*

**Fujitsu M1935D**
**List Price:** $595; $100 for optional daughterboard.
**Requires:** RS-232 cable.
**In Short:** A full-featured 2,400-bps modem with excellent documentation and a reasonable price tag

CIRCLE 612 ON READER SERVICE CARD

## Gandalf Data Inc.

The Gandalf Data Access Series SAM 24S modem is better suited to use with a dumb terminal than with a PC. This is understandable since Gandalf Data has been selling modems and other data communications equipment, such as multiplexers and data PBXs, to mainframe and minicomputer users for many years.

For terminal users, the Access 24S is very easy to use. Just hit Return and it will ask, "Dial: What Number?" You then enter the number you want to dial. As the call progresses, the Access 24S will keep you informed with messages such as "Dialing," "Waiting," "Ringing," and "Busy

# Microsoft is pleased to announce that Microsoft QuickBASIC 2.0 is second best.

By any measure, Microsoft® QuickBASIC 2.0 was an outstanding success.

We'd taken all the things people loved in the BASICA interpreter, and added a ton of advanced features to make a compiler that was faster and more advanced than any BASIC ever.

A compiler that overwhelmed even the toughest judges:

"A snazzy new programming tool that bridges the gap between earlier BASICs and the high-performance languages like C." Peter H. Lewis, *The New York Times*, July 15, 1986.

"(Microsoft QuickBASIC) ... represents an outstanding contribution to the microcomputer world." Dennis Dykstra, *Byte*, February 1987.*

*PC Magazine* was so impressed, in fact, that they gave Microsoft QuickBASIC their Technical Excellence award. Before long, Microsoft QuickBASIC 2.0 was the most award-winning BASIC compiler ever.

**But for us, excellence wasn't good enough. Introducing Microsoft QuickBASIC 3.0.**

We looked for more ways to make BASIC better. Ways to make the programming easier and faster. And then we set to work on what became Microsoft QuickBASIC 3.0.

Our first improvement was in debugging. Our new compiler includes an integrated debugger that is simply unparalleled.

Based on the technology of the famous CodeView™ debugger included with our C Compiler, it gives you complete control over your program and data. You can observe the contents of any variable. You have your choice of single-step, animate or trace modes.

You can even set dynamic breakpoints at runtime while still using the source for reference. Which lets you easily trace your program's operation without the bother of PRINT statements and recompiling.

This debugger is completely integrated into the compiler. So you can, for example, start debugging your program while it's running by simply pressing CTRL-Break. Instantly, the debugger is activated and you're in control again.

**Faster math. And faster programming.**

On PCs equipped with math coprocessors, Microsoft QuickBASIC 3.0 blazes through calculations. Our new in-line 8087 code is as fast as you can get. And that's just the start of the speed advantages.

"Microsoft QuickBASIC is phenomenally fast in compilation... (it) outstrips all other compilers." Marty Franz, *PC Tech Journal*, December 1986.

Fast compiling is nice, but it's not the most important consideration. Program development time is.

Microsoft QuickBASIC makes your programming substantially faster by integrating a sophisticated editor into the compiler itself.

Any errors found during compilation trigger the editor to take over, putting your cursor right on the trouble spot.

And if you have more than one error, the editor will keep track of them all, letting you fix your bugs one after another. No more hassles with the endless recompiling of other compilers.

**Divide and conquer.**

Microsoft QuickBASIC gives you the power of advanced languages without the headaches. A case in point: separate compilation.

Long used in languages like C, separate compilation simply means that you can compile your programs the same way you write them, a piece at a time. Once compiled, your individual modules can be combined into libraries and added to future programs without the bother of recompiling.

But that's just one way Microsoft QuickBASIC supports structured programming.

In addition to the previous Microsoft QuickBASIC extensions like block IF/THEN/ELSE statements, Version 3.0 adds a new set of control structures. Features like the new SELECT CASE, DO WHILE, and DO UNTIL make even the most complex programs amenable to reason.

**Still the same. Only better.**

After all this work on improvements, we didn't forget what made Microsoft QuickBASIC the success it is. This compiler is still the leader in BASICA compatibility. From graphics to sound, this BASIC commands the PC like no other.

For more Microsoft QuickBASIC advantages, just turn the page.

*© McGraw-Hill, Inc.

# Introducing Microsoft QuickBASIC 3.0.

**Integrated Program Debugging.**

Microsoft QuickBASIC 3.0 includes the most advanced BASIC debugger available. This built-in debugger lets you track both program flow and the contents of variables with ease.

- Three debugging modes: single-step, trace, and animate.
- Set, clear, and examine breakpoints. NEW!
- Adjustable windows let you view source code, variable contents, and program output—all at the same time. NEW!
- Display and search through source code while debugging. NEW!

**Advanced Integrated Editor.**

The Microsoft QuickBASIC Editor is integrated with the compiler to make all your programming as fast and efficient as possible.

- Built-in editor places cursor on problem in source when error occurs in compilation.
- In contrast to other compilers that give up after finding a single error, Microsoft QuickBASIC's editor keeps track of all errors found during compilation. No more hassles with recompiling over and over.
- Editor supports both Insert and Overtype modes. NEW!
- Fully compatible with SuperKey,® ProKey,™ and SideKick.® NEW!

**8087 Math Coprocessor Support.**

The standard Microsoft QuickBASIC math package has been enhanced to take advantage of numeric coprocessors in machines that have them. Now you have several ways to optimize your program's performance.

- Microsoft QuickBASIC 3.0 generates fast in-line code for machines equipped with 8087 or 80287 coprocessors. Now your programs can be as fast as the hardware allows. NEW!
- Microsoft QuickBASIC includes full 80-bit IEEE Math support for programs that demand the most precise calculations possible. NEW!
- Choose from the Microsoft Binary Math routines for faster math or the new 8087 software emulation routines for more accuracy when you don't have a coprocessor.

**Structured Programming Support.**

In addition to the standard BASICA commands, Microsoft QuickBASIC Version 3.0 has a variety of advanced statements and features similar to those found in C and Pascal. By making structured programming easy, Microsoft QuickBASIC makes programs both easier to write and easier to maintain. Older BASIC features like line numbers and GOTO statements are strictly optional.

- New statements include SELECT CASE, DO WHILE and DO UNTIL, LOOP WHILE and LOOP UNTIL, and EXIT. NEW!
- Block IF/THEN/ELSE/END IF statements virtually eliminate any need for GOTOs.
- Subprograms may be called by name and passed parameters.
- Microsoft QuickBASIC now supports user-defined CONSTANTS. NEW!
- Both true local and global variables are supported.
- Microsoft QuickBASIC supports alphanumeric labels as well as line numbers.

**Modular Programming Support.**

Microsoft QuickBASIC's separate compilation lets you create stand-alone programs a piece at a time. You just compile your routines and add them to a library. Future programs can use those routines by simply linking in your libraries.

- Create stand-alone programs, with or without a separate run-time package.
- Link support routines once at beginning of a programming session, then forget about linking.
- Includes library for access to DOS and BIOS interrupts.
- Microsoft QuickBASIC makes it easy to use professional support libraries such as Softcraft's Btrieve package.

**A compiler with both speed and power.**

Microsoft QuickBASIC gives you the most advanced compiler features and debugging possible, without any speed handicaps. Microsoft QuickBASIC 3.0 compiles code up to an astonishing 12,000 lines per minute on an IBM® PC/AT.

Microsoft QuickBASIC also supports extra-large programs. Your programs can use all available memory for any mix of code and data. Individual arrays may use up to 64K bytes each (to the PC's limit of 640K).

**BASICA Compatibility.**

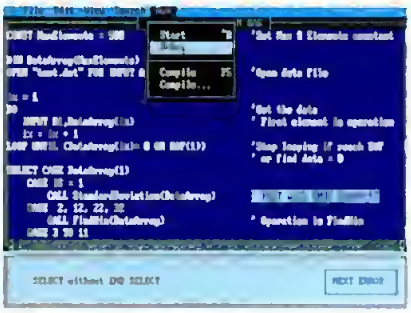
It's not hard to see why Microsoft's QuickBASIC is more compatible with IBM's BASICA than any other compiler. After all, we wrote it for IBM. And we've kept the same features in Version 3.0.

- Graphics statements include WINDOW, VIEW, DRAW, GET, PUT, LINE, CIRCLE, LOCATE, and SCREEN.
- Sound statements include SOUND and PLAY.
- Support for EGA extended graphics modes including the new 43 line mode.
- Supports standard BASICA structures such as GOSUB/RETURN, WHILE/WEND, and event handling.

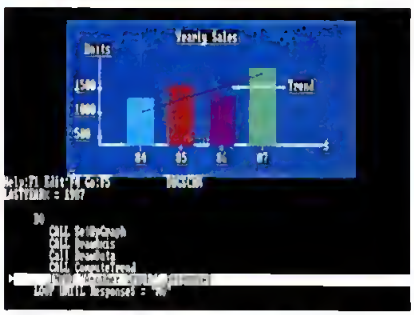
**Dramatic execution speed enhancements.**

| Benchmark | Microsoft QuickBASIC 2.0 | Microsoft QuickBASIC 3.0 |
|---|---|---|
| Graphics (500 Circles) | 21.42 | 9.83 |
| Floating Point Math | 16.92 | 6.48 |
| Quick Sort | 5.27 | 3.02 |

All test results in seconds. Tests were performed on an IBM PC/AT equipped with an 80287 coprocessor and an 8 MHz clock.



*Programming is easier with the built-in editor that searches for all errors, letting you correct them and recompile without leaving the programming environment.*




*Pinpoint errors by tracing through your source code with the integrated debugger. You can set breakpoints and observe the contents of variables.*

## Microsoft® QuickBASIC

**For more information or the name of your nearest Microsoft dealer, call (800) 426-9400. In Washington State and Alaska, call (206) 882-8080. In Canada, call (416) 673-7638.**

Microsoft and the Microsoft logo are registered trademarks and CodeView is a trademark of Microsoft Corporation. SuperKey and SideKick are registered trademarks of Borland International, Inc. ProKey is a trademark of RoseSoft. IBM is a registered trademark of International Business Machines Corporation.

**Microsoft®**

Signal Received." To make life even easier, the modem will store up to ten telephone numbers in a directory for you so all you have to do is enter D1 to dial the first number and so on.

PC users will have a bit more difficulty, however, since PC communications software expects to talk to Hayes-compatible models. While the Access 24S does have a "Hayes-compatibility mode," the only Hayes command supported is ATD (to dial). None of the other Hayes commands or S registers are supported.

In fact, the Access 24S could not even handle the small number of Hayes commands that the PC Labs testing procedure required at 2,400 bits per second.

This lack of compatibility, combined with the $595 list price, put the Gandalf Access 24S on my not-recommended list.—**Howard Marks**

PC MAGAZINE FACT FILE

**Gandalf Data Inc**
1020 S. Noel Ave.
Wheeling, IL 60090
(312) 541-6060

*The Gandalf Data Access modem supports one Hayes command: ADT.*

**Gandalf Data Access Series SAM 24S**
**List Price:** $595
**Requires:** RS-232 cable.
**In Short:** A 2,400-bps external modem better suited for a dumb terminal than a PC.

CIRCLE **634** ON READER SERVICE CARD

## General DataComm Inc.

Christmas might be over for other kids, but it only started for me once I took a look at the General DataComm Acculine 224 2,400-bit-per-second modem. If any modem can be called pretty, this one from General DataComm is a beauty. If any modem can be called intelligent, this one's an Einstein. Its many features come at a premium price, but to users who want a quality modem, it's worth every penny.

It has a wider body than most—6¾ inches across by 10½ inches long, compared to the Hayes Smartmodem's 5½ by 9½-inch dimensions. The cream-colored housing is made of hard molded plastic and has clean lines and rounded edges. With its 11 LEDs on the front, compared to the 8 on the Hayes, this contraption looks like it should be in the transporter room of the starship *Enterprise* instead of on your desk.

The Acculine 224 is more than just another pretty peripheral. It's a good answer to most PC communications needs. Besides operating at conventional 300-, 1,200-, and 2,400-bps speeds, it recognizes the European CCITT specifications. It has password protection, works in transparent synchronous mode with an optional cable ($99), and it has built-in analog and digital loop self-testing for both the modem itself and the connection to a remote modem. You can select the line impedance, which is an asset for Canadian users, who need a 600-ohm impedance instead of the 900 that is used in the United States.

Besides the LEDs usually found on a Hayes Smartmodem or clone, the Acculine 224 has some extra ones: SY is lit during synchronous transmission; QM monitors the quality of a phone connection and flicks off when a line is too poor for accurate data transmission; CO indicates carrier on; TM lights when the Acculine 224 is in testing mode; and 24 replaces the Hayes HS LED and denotes a 2,400-bps connection.

There are two configurations for the Acculine 224, the differences between them being $175, a 64K-byte buffer, and support for X.25 packet switching and MMP error correction. The stripped-down version has a buffer large enough to hold a password and one phone number—useful for synchronous applications in which one number is often dialed.

The Acculine 224 pulled its weight in PC Labs testing. At 1,200 bps, it ranked right up there with the top contenders, proving almost as resistant to line noise on good and average phone lines as the Hayes Smartmodem 2400 and 2400B; moreover, it actually burned the Hayes 2400 external on the poorest-quality lines. In 2,400-bps testing, its performance was about average compared to the other 2,400-bps modems we tested.

**ANALOG AND DIGITAL SELF-TESTS**
General DataComm made the Acculine 224 highly Hayes compatible and extend-

PC MAGAZINE FACT FILE

**General DataComm Inc**
1579 Straits Turnpike
Middlebury, CT 06762-1299
(203) 574-1118

*The Acculine 224 proved to be intelligent, full-featured, and fast.*

**General DataComm Acculine 224**
**List Price:** $595; with X.25 or MNP error correction, $770; Isynch cable: $99; *GDC Comm*: $45
**Requires:** 256K RAM, serial port and cable, communications software.
**In Short:** Deluxe 300/1,200/2,400-bps modem loaded with features but at a premium price.

CIRCLE **644** ON READER SERVICE CARD

ed the AT command language to cover features indigenous to its product, such as the analog and digital self-tests. For example, password protection is initiated simply by typing AT N and the password in command mode. One great feature is that unlike most other modems, the Acculine 224 has a help list built right in, accessible by typing AT &S.

The Acculine 224 comes with a heavy DC power supply and has no on/off switch. This is because General DataComm planned for users to keep the modem powered up at all times in order to preserve circuit life and to protect any information in the buffer. The speaker volume is controlled by a knob on the back of the unit, similar to those in most other Hayes-compatible modems. General DataComm gets high marks for writing extensive documentation with succinct instructions for beginners and advanced appendixes for experts.

Although I'm thrilled by the Acculine 224's design, it is, ironically, the modem's single drawback. To save space, modem users often set an external modem on its side. The Acculine 224 falls over because of its sloped edges. This is a small price to pay for good looks but may be a problem for some users. General DataComm has given us a connoisseur's modem. With that in mind, I'm sure more-price-conscious users can make do with a lower-cost alternative. But for users with heavy telecommunications needs or for those who want the best and are willing to pay for it, the Acculine 224 is worth the expense.—**Chris Johnston**

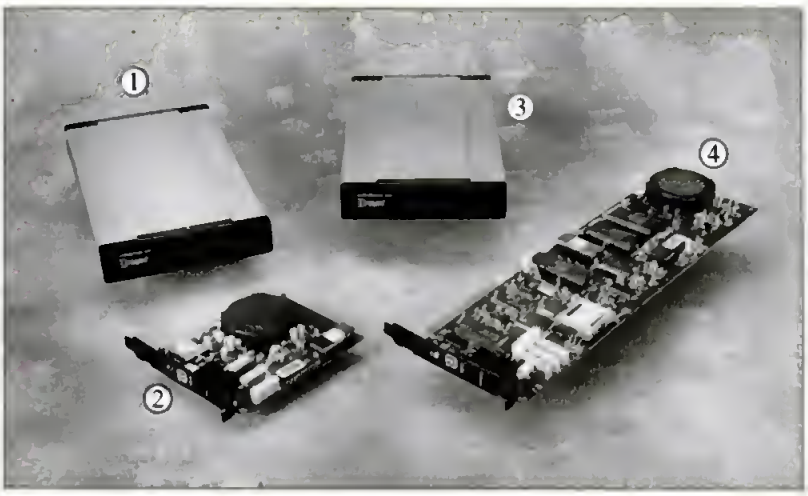
## Hayes Microcomputer Products Inc.

Modem buyers ask predictable questions. First they ask, "How much?" and next they ask about Hayes compatibility. Well, the Hayes line of modems is as purebred Hayes-compatible as they come, but, as with the IBM-versus-clone conundrum, a heavy price tag is attached to the standard. Generally speaking, Hayes modems are rugged, reliable, flexible yet highly controllable, and at least twice as expensive as most Hayes clones.

Why has Hayes become the IBM of the modem world? To begin with, the mechanical components are built like tanks. The metal case puts a few pounds on the external models, but modems take enough abuse to warrant the protection. The externals have a hefty 13.5-volt power supply with a three-prong plug and thick power cord, a sturdy on/off toggle switch on the modem itself, and a general no-nonsense tight look. The internal cards are hand-

### PC MAGAZINE FACT FILE

**Hayes Microcomputer Products Inc.**
705 Westech Dr.; Norcross, GA 30092; (404) 449-8791




*Hayes modems continue to enjoy the enviable title of industry standards. If you are willing to pay the price, a Hayes product is a true communications security blanket.*

① **Hayes Smartmodem 1200**
**List Price:** $599
**Requires:** Serial port, RS-232C cable with DB-25P (male) connector, communications software.
**In Short:** As well built as ever, the Hayes external 1,200-bps modem incorporates the full Hayes-compatible AT command set.
CIRCLE 696 ON READER SERVICE CARD

② **Hayes Smartmodem 1200B**
**List Price:** $489; with *Smartcom II*, $549.
**Requires:** One half-length slot, 12 volts from internal power supply. 192K RAM and DOS 1.1 or later for *Smartcom II*.
**In Short:** An internal 1,200-bps modem that requires a half-slot for installation. Sold bundled with *Smartcom II*—the Hayes communications package designed to maximize modem performance—the modem outperforms the software.
CIRCLE 697 ON READER SERVICE CARD

③ **Hayes Smartmodem 2400**
**List Price:** $899
**Requires:** Serial port, RS-232C cable with DB-25P (male) connector, communications software.
**In Short:** This external 2,400-bps modem is the latest de facto industry standard. The modem has an extended AT command set that includes programmable phone numbers and configurations, plus the ability to handle synchronous communications via the HSI (Hayes Synchronous Interface).
CIRCLE 698 ON READER SERVICE CARD

④ **Hayes Smartmodem 2400B**
**List Price:** $739; with *Smartcom II*, $799.
**Requires:** One full-length slot, 12 volts from internal power supply. 192K RAM and DOS 1.1 or later for *Smartcom II*.
**In Short:** An internal 2,400-bps modem that occupies a full expansion slot. This modem has an extended AT command set that includes programmable phone numbers and configurations, plus the ability to handle synchronous communications via the HSI (Hayes Synchronous Interface).
CIRCLE 695 ON READER SERVICE CARD

somely and securely soldered.

As a veteran Hayes user and chronic cord mangler, I drop my own external Hayes modem off the edge of my PC often enough to amount to a personal Hayes "drop" test. This modem can handle tough treatment. I have not replicated my drop test with the internal modems, but I can report that very firm pressure can be exerted during installation without damaging the cards.

The LED indicator lights on the external modems are informative, easily visible, and immediately responsive to modem activity. Many modems that claim Hayes compatibility do not offer the full eight indicator lights; Hayes OH (off hook) and AA (auto-answer) are often eliminated from clone designs. The no-slouch 2-inch speakers are clearly audible and fully responsive to the gamut of Hayes volume control and on/off commands. The internal speakers are firmly encased on the boards with no exposed leads or tissuey layers.

**THE HAYES STANDARD** Besides excellence in manufacturing, the Hayes standard is based on its well-entrenched command set and result codes. Modem dialing BH (before Hayes) was, with the exception of a few oddball schemes, a manual affair that involved the use of separate dialers. In 1981, Hayes introduced its first AT (Attention) command set on the Smartmodem 300. That modem achieved instant celebrity status, manual dialing faded into oblivion, and an established "Modem Speak" was born. Essentially, the Hayes AT command set and result codes have remained unchanged, with a few extra features added to extend the capabilities of higher-speed modems.

Today, in addition to the Smartmodem 300, the Hayes line of PC-compatible Smartmodems includes 1,200- and 2,400-bit-per-second models. These are available in both internal (the Smartmodem 1200B and Smartmodem 2400B) and external (the Smartmodem 1200 and Smartmodem 2400) modems. There is also a new internal modem (the Smartmodem 1200C) for the IBM PC Convertible.

On the software side, Hayes markets *Smartcom II*, a communications program. *Smartcom II* is available in a bundled package with the internal modems (the externals are not tied into any one computer). This software signifies the company's attempt to package PC hardware and software, maximizing modem performance and ease of use. For a number of reasons, I find the modems are best off without their software complement; while I have never doubted the intelligence of the Smartmodems, I do wonder about *Smartcom II*.

Besides excellence in manufacturing, the Hayes standard is based on its well-entrenched command set and result codes.

The 2,400-bps modems are newer, more robust implementations of the Hayes modem technology, but the 1,200-bps models have a reputation for solid performance. The Smartmodem 1200 and the half-card 1200B both have 40-character command buffers (which are large enough to store one phone number dial sequence), and they both use the complete Hayes AT command set.

Besides offering the full spectrum of commands for dialing, speaker adjust, code display, and call originating and receiving, all four models can handle the PBX calling environment, Bell and CCITT compatibility, last-command repeat, and a number of call progress features such as waiting for a second dial tone and providing busy-signal feedback. A complete set of loopback self-tests allows users to test these modems to determine whether a problem is modem-, phone-line-, or remote-modem-based.

The Hayes modems do not support COM3 and COM4 at this time, but Hayes representatives have assured me that as soon as a standard exists, they will support them. Typically, modems that imitate the Hayes lack a few of the more esoteric Hayes command codes. Most notable are the volume control (L) commands for speaker control, the @ command for use in systems without dial tones, and the flash "!" command for transferring calls.

While the 1,200-bps modems rely partly on DIP-switch settings, the more modern 2,400-bps models are entirely software controlled and have no DIP switches to set (other than the COM1/COM2 switch on the 2400B). The 2400 and 2400B are functionally identical, with a single exception: the 2400 external modem has a dumb-mode strap available (which ignores DTE commands in special synchronous and unusual conditions).

Both 2,400-bps models incorporate a few extra AT commands to increase functionality a good deal beyond that of the 1,200-bps modems. The extra features include the ability to store four telephone numbers of 36 characters each in nonvolatile memory. These modems also store two complete configuration profiles (using command-selectable defaults), allowing users to switch, for example, between synchronous and asynchronous communications with a single AT command. All stored configurations and phone numbers can be viewed with an AT command, and the stored parameters, which can be saved in memory, include 20 settings.

**FILE TRANSFER** For some, the most compelling reason to buy the Hayes 2,400-bps model may be to support Hayes's attempt to standardize asynchronous to synchronous communications. Traditionally, this type of file transfer requires a terminal emulation board. The Hayes 2,400-bps modems include the Hayes Synchronous Interface (HSI), a set of routines that let the modem receive an asynchronous file and convert it to synchronous within the modem. Hayes plans to license a Hayes Synchronous Interface Driver, incorporating the HSI technology, to developers for a $100 fee. Will this mean good-bye to emulation boards? Only if developers jump on the HSI bandwagon.

The Hayes line of modems has evolved from using DIP-switch setting configurations to software control. Behind the Smartmodem 1200's front panel are ten factory-set DIP switches. Half of these

switches can be overridden through software commands, but the other half must be manually changed. The 1200B has four switches accessible from the backplate of the modem; its other configurable features are software controlled. The Smartmodem 2400 is entirely software controlled, and the 2400B has only a single DIP switch to select an appropriate port. Those wearied by peering into impossible-to-reach DIP switch corners will appreciate both the 1200's up-front placement of easy-to-flip switches and the 2400's software coup.

Despite the external 1200 and 2400 modems' hefty feel, neither is a space hog. As a matter of fact, conservation of space seems important to the Hayes designs. The development of a half-card 1200B and the ergonomically pleasing measurements of the slender external models demonstrate the point.

Both the internal and external modem setups are straightforward. With either external modem, it takes about 5 minutes from cracking the user guide to completing the modem connection. Naturally, prying the cover off your PC and popping a card in takes longer than attaching an external RS-232 cable, but the internal installation is equally a breeze. The half-card internal 1200B and full-card 2400B fit nicely in their expansion slots, and the phone jacks are easily aligned in the rear PC slot.

Hayes further accommodates ergonomic demands by supplying adequately lengthy "hey I can reach" cables. You needn't be married to your wall jack or outlet with the 6-foot long transformer and phone cables. The only exception to manufacturing excellence I discovered was the paint on the backplate labels of the 2400B. I managed to rub the COM1/COM2 switch label off in the course of regular installation. Thankfully, I couldn't duplicate this result on any other Hayes modem labeling.

The results of our PC Labs signal-to-noise tests proved interesting. Essentially, I found that the 2,400-bps models performed slightly better than the 1,200-bps modems when both operated at 1,200 bps. Naturally, a slower transmission speed will fare better on a noisy line, but there's another explanation for the better performance of the 2,400-bps modems than the 1,200-bps modems, given the same 1,200-bps rate.

The 2,400-bps modems have a much more robust implementation of what's termed "adaptive equalization" capabilities. In all probability, the range of noisy lines that 1,200-bps modems can accommodate is more fixed than that of 2,400-bps modems. The 2400 technology allows the modem to adapt to various types of line noise across a greater range. It would seem that if you wanted an optimal Hayes modem for a noisy line transmission, you would choose the 2400 transmitting at 1,200 bps.

All the Hayes modems performed respectably, but all had competitors that were able to outperform them.

The performance of the 2400 models at 2,400 bps is not as good as it is at 1,200 bps. In fact, I'm obliged to note that the Smartmodem 2400 failed to transmit without error on the noisiest line.

In comparison with others tested, all the Hayes modems performed respectably, but all had competitors that were able to outperform them, especially at the 2,400-bps rate. The Hayes 1200 and 1200B did well and the 2400B was acceptable, but the 2400's performance was less outstanding. Given the reasonable quality of most line conditions, your Hayes will probably never give you a speck of trouble. But if you are victimized by line noise, perhaps the Hayes standard is insufficient.

**SMARTCOM II** No discussion of Hayes modems is complete without a brief look at *Smartcom II*. Smartmodems and *Smartcom II* should be like milk and cookies—the perfect complements. In fact, *Smartcom II* does offer a status line that reports the Hayes result codes and a menu shell that allows you to control the Hayes commands with English-like prompts. It even hooks into the Hayes modem registers, which makes it incompatible with many clone modems. However, the menu removes you so far from the basic level of communicating with your modem that it's easy to get lost because of the insulation. It's ironic that *Smartcom* is the only communications package I know of that doesn't allow you to use the "+++" command to drop down to the modem's command state. Also, *Smartcom* lacks a powerful script language, and the user interface is tedious.

*Smartcom* sells for a suggested retail price of $149, which means that Hayes modem purchasers save about $70 by buying it in the bundled package. For $80 *Smartcom* is a fair but not great communications package. While the notion of a marriage between communications hardware and software is admirable, in this case I'd opt for divorce.

Hayes documentation comes oh-so-close to the magical "get-up-to-speed quickly"—and then bogs down with a features formula. Nonetheless, the documentation is clear, informative, and well organized. The cardboard quick-reference card, which documents result codes, a command summary, register settings, and other information, is invaluable.

My only complaint is the lack of cohesiveness. Each one of the modems has a panoply of addenda: special offers, last-minute user notes, warranties, getting-started manuals for the external models and, in the case of the Smartmodem 2400 models, synchronous manuals (although I never got one with my 2400B).

Disparate pieces are not necessarily bad, but they will be easily misplaced unless a tidier packaging solution is offered. The largest chasm in documentation lies between the Smartmodem 2400B and the 2400. The 2400 contains a complete chapter on synchronous communications and an addendum to the manual on the same topic. My 2400B modem did not arrive with any documentation about synchronous transmission. Hayes has an addenda to the 2400B covering synchronous communications. Coupled with the fact that the latest batch of Hayes ads refer to the "new" 2400B, my sleuthing suggests that perhaps the 2400B's synchronous capabil-

# 2400-bps modems designed around your needs. So one's always a perfect fit.

**The new Courier 2400e,™ the Courier 2400™ and Microlink 2400.™ More features. More reliability. More value.**

USRobotics new Courier 2400e now offers MNP™—a sophisticated error- and flow-control protocol that ensures error-free data transfer—plus all these Courier 2400 quality features:

Extended "AT" command set • Help screens • Call-progress reporting • Printed operations summary on bottom panel • Automatic speed adjustment, for 2400/1200/300-bps • Auto dialing • Auto answering • Call-duration reporting.

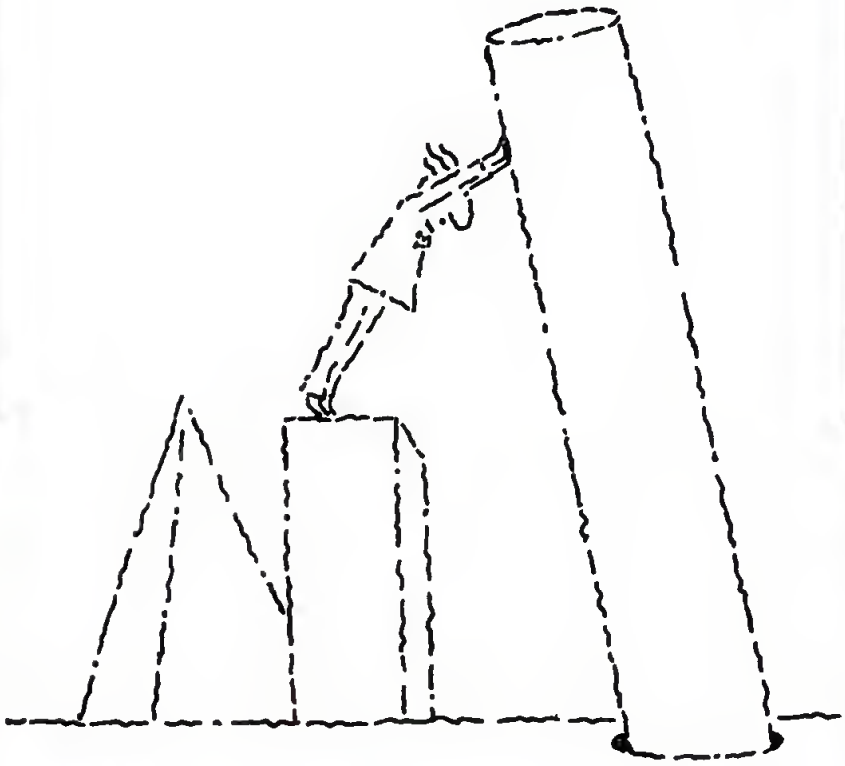
We're introducing new pricing too. With the 2400e at the price of our Courier 2400, and the 2400 costing even less.

Bottom panel

Thousands of electronic bulletin board operators, along with Fortune 50 companies and individual PC users, all have chosen the dependable Courier 2400, with less than 1% returned for service. And all USRobotics modems carry a full two-year parts and service warranty.

**Call now and get your FREE brochure,** and learn more about our stand-alone Courier modems and IBM-PC® plug-in Microlink 2400. Outstanding.

***Call 1-800-DIAL-USR***
***In Illinois (312) 982-5001***



MNP is the Microcom, Inc. trademark for Microcom Networking Protocol, a public domain error-control protocol. IBM-PC is a trademark of International Business Machines, Incorporated.

Yes, please send me your free brochure "24 Questions and Answers on 2400-bps Modems."

Name_____

Title_____

Company_____

Address_____

City_____ State_____ Zip_____

Business Phone ( )_____

6/87-23-2400F

**USRobotics**

The Intelligent Choice in Data Communications.
8100 McCormick Blvd., Skokie, Illinois 60076.

CIRCLE 166 ON READER SERVICE CARD

ities were implemented later than on the Smartmodem 2400.

Hayes has a well-earned reputation for good customer support and service. My questions were quickly and courteously answered by the Hayes technical staff. These same individuals, though, were reluctant to discuss the company's history or future plans. This may be explained by the fact that Hayes is currently in the midst of a legal imbroglio to determine, among other issues, who has the right to use the term "intelligent modem."

Hayes offers a 2-year limited warranty with an optional 4-year extended protection plan.

Hayes modems are truly home grown, designed and manufactured in Norcross, Georgia.

You'd have to take a good hard look around to find modems that do better than the Hayes modems. Sure, a few may have some added features and a few do in fact perform better in noisy situations, but there's a comfort quotient in the Hayes modems that's hard to put a value on.

Horror stories from users whose modems claimed Hayes compatibility abound. Even a supposed Hayes-compatible modem with the identical command set can still prove to be incompatible because of timing incompatibilities and minor changes in the registers. In the murky world of data communications, in which the source of an error is often elusive, buying a Hayes product offers the user a security blanket. This blanket is expensive, but it comes with solid features, style, and support. **—Robin Raskin**

## IBM Corp.

The first thing you notice about the external IBM 5842 Modem is its weight. While most of the modems reviewed in this article weigh less than a pound, the 5842 tips the scales at a portly 5 pounds. This industrial-strength modem performed very well in the PC Labs modem torture tests, turning in a performance significantly better than the equivalent Hayes model.

Like most IBM products, the 5842 has its idiosyncracies. The phone cord is permanently attached, and the modem includes its own command set. It also supports standard Hayes commands.

The IBM command set includes commands for maintaining directories of the numbers and log-on commands for your favorite on-line services. These entries can also be protected by passwords. The log-on commands are text strings with delays rather than real scripts that look for responses from the host computer. The 5842 also has a programmable answerback, used for telex applications and some security systems, when you are using the IBM command set. There is even a command to report the quality of the line you are using.

The IBM commands are prefixed by Ctrl-N as opposed to the AT of the Hayes commands. Unfortunately, the first command you issue locks the modem into either IBM mode or Hayes mode until it is reset, so you can't mix the commands. Hayes command support is limited to the most commonly used commands, but this should not be a problem with most software. *Carbon Copy*, which is usually picky about which modems it will work with, had no problems with the 5842.

The 5842 also comprises a full set of diagnostic and testing features, including analog and digital loopback tests. These tests are well documented in the manual and include a step-by-step debugging procedure.

All in all, the 5842 is a solid, well-constructed modem. Like all IBM products, it embraces industry standards not set by IBM only grudgingly, but its performance makes it worth serious consideration for those in remote areas or with constantly noisy phone lines.

The same cannot be said for the IBM 2400-bps Internal Modem. While this modem performed about as well as the comparable Hayes 2400B in PC Labs tests, it was the most difficult to install of all the internal modems tested.

The first problem is that the 20-foot telephone cord is permanently attached to the modem, so you have to snake it through the slot in the back of your PC rather than plug it into the modem after installation. IBM is so proud of this feature that the modem is shown in its ads sans cable. After pulling all this cable through the slot and ripping the skin off your knuckles on the adjacent boards in the process, you discover that IBM is the only maker of internal modems not to include a speaker with its product.

Instead of putting a speaker on the modem, IBM gives you a cable so the modem can use the speaker already in your PC. Once again you get to bark your knuckles. In addition to being a pain to install, this speaker-sharing scheme means that like some other IBM products, the IBM modem is completely unusable in many compatibles that may have their speakers in positions where the cable won't reach or they

### PC MAGAZINE FACT FILE

**IBM Corp.**
1000 NW 51st St.
Boca Raton, FL 33432
(800) 447-4700

*IBM's 5842 Modem is far superior to its internal sibling.*

① **IBM 2400-bps Internal Modem**
**List Price:** $569
**Requires:** One half-length slot.
**In Short:** This modem gave adequate performance, but its lack of speaker, awkward installation process, and Hayes incompatibilities make it hard to recommend.
CIRCLE 460 ON READER SERVICE CARD

② **IBM 5842 Modem**
**List Price:** $719
**Requires:** Serial port, communications software.
**In Short:** An industrial-strength 2,400-bps external modem with excellent performance.
CIRCLE 461 ON READER SERVICE CARD

don't have connectors for this cable.

The IBM internal modem supports IBM's own command set, as well as most of the basic Hayes commands. It is not fully Hayes compatible, however, and some software, including Citibank's home banking software, may not run with this modem.

On the plus side, the internal modem does fit in one short slot and is covered in black plastic on both sides so as not to short out on adjacent cards.

In the 2400-bps Internal Modem, IBM has produced a product that would be laughed off the market if it didn't have the IBM name. The lack of a speaker and full Hayes compatibility place this product firmly in the not-recommended category.—**Howard Marks**

## IDEAssociates Inc.

IDEAssociates has chosen to stick to the basics in adding a 2,400-bit-per-second internal modem to the company's line of other board-level products. The IDEAcomm 2400 provides the essentials of first-rate performance and Hayes compatibility—enough to satisfy the communications needs of many users. On the other hand, those who need advanced features such as ROM-based error correction and storage for multiple numbers will have to look elsewhere, and a few noncritical features are marred by design flaws.

The IDEAcomm modem is built on a full-size add-in board and appears to be solidly constructed. Soldered joints on the review unit looked tight, and there were no loose chips or other components. The board fits comfortably but snugly into an expansion slot, and its slim profile keeps it out of the way of adjacent boards.

From the point of view of convenience, however, the user who has to install and configure the board will find that its design is less than ideal. The shortcomings are rather minor, and none of them will interfere with telecommunications once installation is complete. Still, with so many modems offering similar features and performance, you may want to split hairs in the convenience category when comparison shopping.

The first problem is with the DIP switches, the user's perennial bane. The IDEAcomm 2400 has only four of the little devils, which is certainly an improvement over the eight found on most modems. Two of the switches function together to select the COM port assigned to the modem. Inexplicably, the IDEAcomm modem can be configured for ports 1 to 3 but not COM4. The third switch sets single or multiline operation, and the fourth determines how the unit handles the carrier tone detect function.

**REVERSED SWITCHES** If you're one of the lucky few who can set the switches permanently before installing the card, the only obstacle you'll face is the diagram in the user manual, in which the directions of the off and on switch positions are reversed. Once the modem is in your PC, however, you'll have a difficult time changing the switch settings without removing the card. The DIP-switch block is accessible through an opening in the modem card's rear plate, but the block is recessed too far from the opening, and the switches are hard to reach and manipulate. What's more, the numeric labels for the individual switches aren't visible from the rear.

Labels are missing from the two RJ-11 phone receptacles on the rear plate, although the owner's manual says that these ports should be marked "wall" and "phone." Another annoying shortcoming is the design of the volume control for the modem speaker. It's nice to have a hardware volume control, but this one is simply a bare metal rod protruding through the rear plate. Not only is there no knob to make the control easier to turn, but the rod sticks out just barely far enough and is hard to grip firmly.

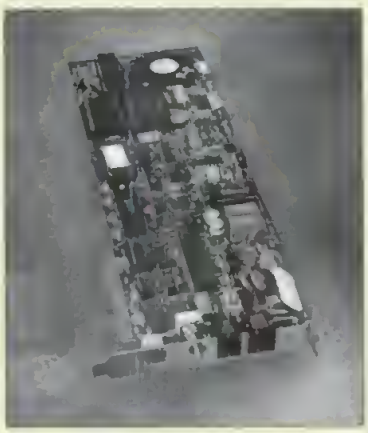
Despite these inconveniences, the IDEAcomm 2400 delivers where it counts: in error-free transmission of data. In PC Labs trials and in real-life testing, the modem gave excellent performance at both 1,200 and 2,400 bps. While slightly more transmission errors occurred at 2,400 bps on the noisiest lines, the modem still placed among the top performers even under these conditions.

The IDEAcomm modem passed the tests for basic compatibility with the Hayes AT command set and will run the gamut of commercial communications software. You'll find only passing reference to this fact, however, in the user manual that comes with the card. The manual is primarily a guide to the use of the IDEAcomm communications software package

The IDEAcomm 2400 delivers where it counts: in error-free transmission of data.

PC MAGAZINE FACT FILE

**IDEAssociates Inc.**
29 Dunham Rd.
Billerica, MA 01821
(617) 663-6878



*The IDEAcomm 2400's design flaws do not affect its functioning.*

**IDEAcomm 2400**
**List Price:** $645
**Requires:** One full-length slot.
**In Short:** This full-slot, 2,400-bps internal modem is an excellent performer, but it is short on extras, has incomplete documentation, and suffers from inconvenient design features.

CIRCLE 699 ON READER SERVICE CARD

included with the modem and contains no information on programming the unit with the Hayes commands. Taken on its own terms, though, the manual is clearly written and attractively designed.

The IDEAcomm 2400 makes a good modem for basic PC telecommunications. A bit more attention to design detail, however, would make it even better.
—Steve Cummings

## Kyocera International Inc.

To lure a skeptical buyer, a Hayes-compatible modem should offer extra features, as well as an extra-special price. The Kyocera KM1200D and KM1200S both offer a good price and a slew of nice features, but they fall prey to the cloners' Catch-22: Offer extra features, and you're bound to stray from the Hayes design. Suddenly you're not Hayes compatible anymore.

Kyocera International, based in Kyoto, Japan, is a $1.5-billion-a-year manufacturer whose flagship product is, believe it or not, ceramic packages. It is no newcomer to the computer industry, however, since it is responsible for the design of the Radio Shack Model 100 and produces components for companies such as Victor. It also manufactures printers, scanners, and other peripherals that are marketed under the Kyocera name.

The Kyocera modems have a nice but definitely low-budget look about them. The external modem is encased in a modernistic, lightweight plastic case with a plastic on/off slider. The power supply is a mere 6 volts with a single-hole plug that is more apt to slide out than I'd be comfortable with. The phone cord included is noticeably short—about 4 feet—which keeps you close to your wall jack. The modem supports the RJ-11, -12, and -13 jacks, but, unlike Hayes modems, does not support RJ-41 and RJ-45. There are two jacks on both Kyocera models, so there is no need for a T (or Y) connector to enable your phone to stay on-line as well.

The front panel on the KM1200S has just six indicator lights: MR, TR, SD, RD, HS, and TM. Notably missing are the familiar Hayes OH (off hook) and AA (auto-answer). The slim lights are angled back toward the top of the modem, making it a tad difficult to see which ones are lit. There are four DIP switches on the back panel.

The internal model KM1200D requires a full expansion slot—a heavy demand from a 1,200-bit-per-second modem. The speaker on the internal model has exposed plastic tissue and a bendable wire connection to the board that is not enclosed in any protective structure. Nonetheless, all the components on the board appear well soldered and tight. The internal modem has no configuration switches; thus, to select COM1/COM2, it uses jumpers. Neither modem supports COM3 or COM4.

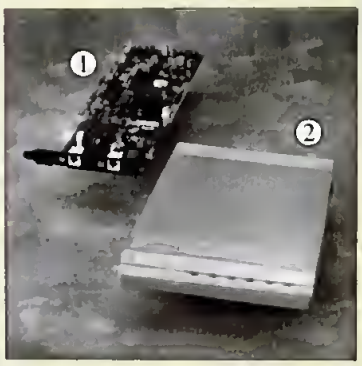
**CLOSE COMPARISON** A command-by-command comparison shows subtle differences between the Hayes standard and the Kyoceras. Hayes modems allow you to type in upper- or lowercase, though you cannot totally mix the two. The Kyocera commands must be typed entirely in uppercase. The Kyoceras have no speaker volume control—neither through hardware nor software. The Hayes B command is used to select CCITT versus Bell protocol. The Kyoceras do not support CCITT, and the B command elicits a display of the bit-per-second rate, data length, and parity. The Kyoceras offer an analog loopback test, but no digital test. The analog test determines whether your modem can process a signal, but only digital tests can verify the integrity of the outside line and the remote modem.

Other Kyocera departures from Hayes include using the Y command to enable BUSY detect and the G command to set status value in a slightly different manner from that of standard S commands. Some of the command discrepancies make the Kyoceras more functional than a Hayes. For example, as an extension of the Hayes A/ (repeat last command), you may include the number of times to repeat a command. Or you can call for on-line help to list the modem commands by using Kyocera's version of the "!" command. This help feature displays a brief summary, arranged alphabetically, of all the Kyocera commands, or it can respond with information for a single specified command. Hayes uses "!" for a PBX extension, signaling the modem to wait for a second dial tone. The Kyoceras omit this valuable command, but you can rig up a PBX connection using the "," delay. Finally, the Kyocera provides on-screen dialing feedback, displaying the digit-by-digit progress of your phone number.

According to the manufacturer, early versions of its modems were less Hayes compatible than more recent ones. Kyocera attributes this to a timing problem.

PC MAGAZINE FACT FILE

**Kyocera International Inc.**
8611 Balboa Ave.
San Diego, CA 92123-1580
(800) 235-1222




*The Kyocera modems walk the line between true Hayes compatibility and extra non-Hayes features.*

① **KM1200D**
**List Price:** $265; with *Microsoft Access*, $415.
**Requires:** One full-length slot.
**In Short:** A Japanese-made 1,200-bps internal modem requiring a full expansion slot, the KM1200D has an on-line help facility and other useful features, but it performs unacceptably in the noisiest line conditions.
CIRCLE 685 ON READER SERVICE CARD

② **KM1200S**
**List Price:** $295; with *Microsoft Access* and serial cable, $445.
**Requires:** Serial port, RS-232C cable with DB-25 (male) connector, communications software.
**In Short:** A Japanese-made, nearly Hayes-compatible external 1,200-bps modem, the KM1200S has nice features but it performs poorly in the noisiest line conditions.
CIRCLE 686 ON READER SERVICE CARD

# Think You Need an AT?

# Think Again.

## TABLE OF BENCHMARK RESULTS

This table shows the results of the processor/coprocessor speed tests using the April 1986 release of PC Magazine's 'PC Labs Benchmark Tests'. These are public domain programs, and are available on diskette from PC Magazine, or via the PC Magazine bulletin board. These results were obtained by us at PCSG, and are not yet official published PC Magazine figures.

The last line in the table, the Norton System Information Test, is not from PC Magazine, but is part of the popular 'Norton Utilities.' The version we used was 3.1, which is the latest version but may not give identical results to older versions.

| | IBM PC | IBM AT | *BREAKTHRU 286* | |
|---|---|---|---|---|
| Clock speed in MHz (IBM PC is 4.77) | 4.77 | 6 | 8 | 12 |
| Empty Loop | 1 | 1.99 | 3.34 | 5.15 |
| Integer add from memory | 1 | 3.35 | 4.41 | 6.02 |
| Integer multiply from memory | 1 | 6.06 | 6.55 | 8.3 |
| Floating point without coprocessor | 1 | 3.33 | 4.42 | 5.76 |
| Prime number test | 1 | 1.95 | 2.85 | 3.7 |
| Lotus 123 macro (640K) | 1 | 2.64 | 3.69 | 4.62 |
| Lotus 123 macro (256K) | 1 | 1.77 | 3.54 | 4.38 |
| Norton System Information Test | 1 | 5.73 | 7.34 | 10.2 |

In every case but clock speed the numbers indicate how many times faster a test is performed than on a regular IBM PC.

# The Next Generation in

## Make Your IBM PC Faster Than an AT in Just 5 Minutes!

| ITEM | PRICE | NORTON SI TEST |
|---|---|---|
| **Breakthru 286 (8MHz)** | **$395** | 7.3 X faster |
| **Breakthru 286-12 (12MHz)** | **$595** | 10.1 X faster |
| ***LIGHTNING***™ speedup software | **FREE** with Breakthru<br>**$89.95** purchased separately | |

**DON'T TAKE OUR WORD FOR IT. USE EITHER BREAKTHRU 286 SPEEDUP BOARD FOR 60 DAYS. IF YOU ARE NOT TOTALLY SATISFIED SIMPLY RETURN FOR A FULL REFUND.**

© Copyright 1987 PCSG

We are excited about our three speedup products. You probably know about our Lightning disk access speedup software that was awarded PC magazines's Best of 1986 award (see box). After the smashing success of Lightning, we developed the Breakthru 286 board to be literally the most advanced, fastest, most feature-rich board available. Now we go ourselves one better with the Breakthru 286-12. This new board has the clock speed cranked up from 8 to 12 MHz for speeds up to 10.1 times faster than an IBM PC.

From September 1986 we guaranteed that Breakthru was the best designed and most functional speedup card available. And the runaway success it has enjoyed truly proved that assertion.

PC MAGAZINE THE BEST OF 1986

**But, no speedup board cuts disk access time in half**

# LIGHTNING™

**software can**

**$89.95 or FREE w/Breakthru**

***"Lightning is almost mandatory.... It has been utterly trouble free in the year I have used it."*** **- Steve Manes, PC Magazine Best of 86 review.**

**Loads with the DOS - always ready as a background program to accelerate disk access. You do nothing - everything is automatic.**

***LIGHTNING*** does what a speedup board can't. You are going to be so amazed when you start to work with ***LIGHTNING*** installed. Most programs that frequently access the disk (hard disk or floppy) like databases or word processors are made instantly faster - up to 2 to 4 times faster.

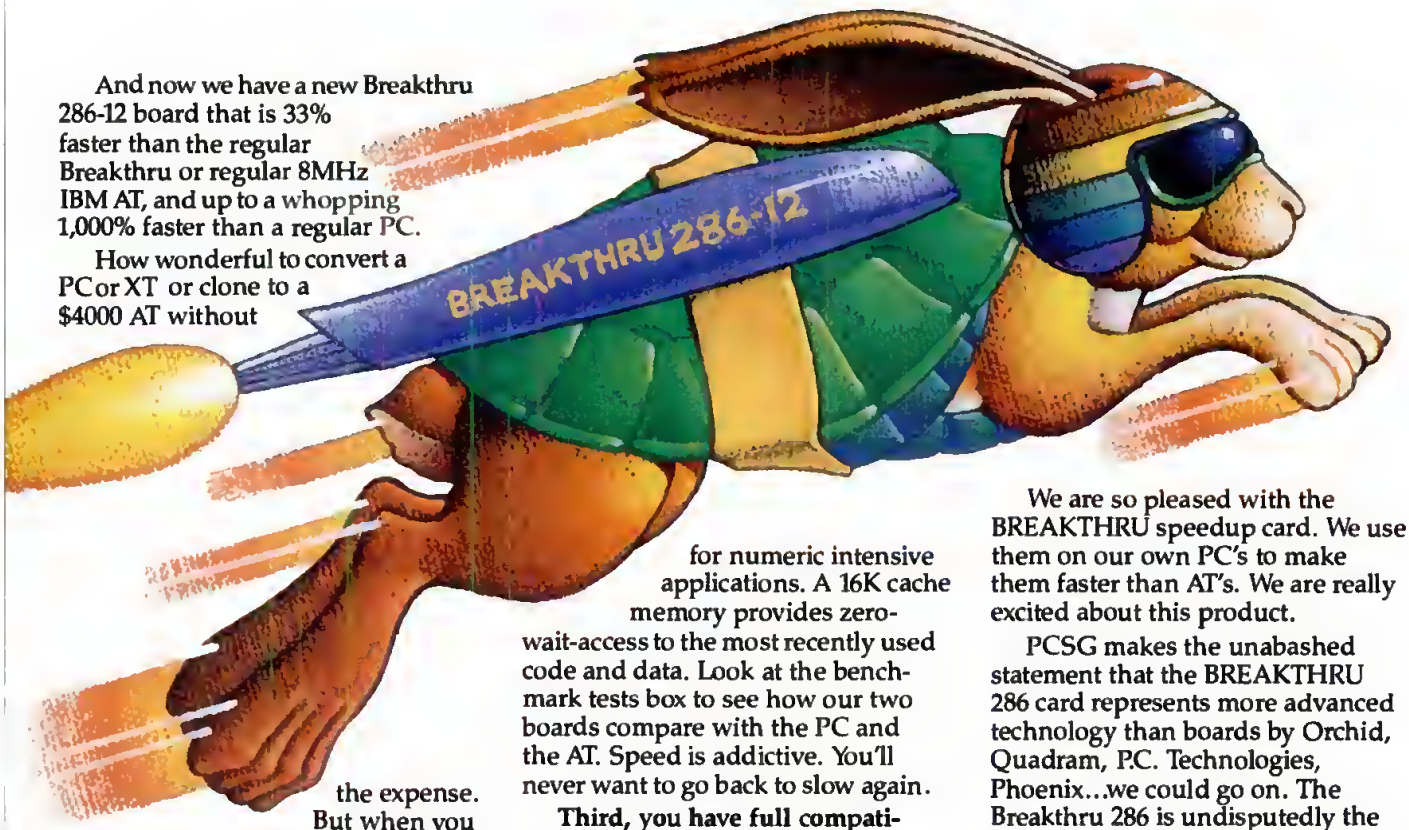
***LIGHTNING*** enables any program to approach the same rapid speed as a RAM Disk, but it does it without the RAM Disk danger of losing precious data if you forget to save it. It works by a principle borrowed (and greatly enhanced) from main frame technology called caching. But it doesn't speed up the microprocessor. You need a speedup board to improve operational speed.

***LIGHTNING*** is the standard against which all our competition measures itself because we achieve universal compatibility with other software and with complete reliability. Data is never lost. ***LIGHTNING*** fully exploits Above Board memory.

Order ***LIGHTNING*** separately or get it free with your Breakthru 286 board

*Turn back for test results*

# IBM PC Speedup Boards




And now we have a new Breakthru 286-12 board that is 33% faster than the regular Breakthru or regular 8MHz IBM AT, and up to a whopping 1,000% faster than a regular PC.

How wonderful to convert a PC or XT or clone to a $4000 AT without the expense. But when you get ready to spend $395.00 or $595.00 you want to be sure your choice is the very best.

***Faster and smarter than an AT- PCSG guarantees it.***

## *HERE'S WHY THESE TWO BOARDS ARE SO SPECIAL.*

**First, they install so easily.** It is a half-slot card, only five inches in length. You don't even have to give up a full slot. What's more, unlike competing products it works in the Compaq Portable and most clones. Easy diagrams show how you just place the card in an open slot, remove the original processor and connect a single cable. There is no software required. From that moment you are running faster than an AT.

**Second, it is advanced.** The BREAKTHRU 286 replaces the CPU of the PC or XT with an 80286 microprocessor that is faster than the one found in the AT. You have your choice of 8MHz at $395 or 12 MHz at $595. You can plug in an optional 80287 math coprocessor chip for numeric intensive applications. A 16K cache memory provides zero-wait-access to the most recently used code and data. Look at the benchmark tests box to see how our two boards compare with the PC and the AT. Speed is addictive. You'll never want to go back to slow again.

**Third, you have full compatibility.** All existing system RAM, hardware, and peripheral cards can be used without software modification. Our boards operate with LAN and mainframe communication products and conform to the Lotus/Intel/Microsoft Expanded Memory Specification (EMS). Software compatibility is virtually universal.

**Fourth, these are the best.** There are several other boards on the market. We at PCSG have compared them all, but there simply is no comparison. What we discovered is that many cards being sold offer only a marginal speedup in spite of their claims and others are just poorly engineered. For example some boards have a cumbersome mechanical switch for going back to 8088 speed, but the Breakthru boards have speed switching software that allows you to drop back to a lower speed on the fly for timing sensitive applications. The 8MHz BREAKTHRU 286 and the 12MHz are unequivocally the best executed and most completely reliable speedup boards manufactured today.

We are so pleased with the BREAKTHRU speedup card. We use them on our own PC's to make them faster than AT's. We are really excited about this product.

PCSG makes the unabashed statement that the BREAKTHRU 286 card represents more advanced technology than boards by Orchid, Quadram, P.C. Technologies, Phoenix...we could go on. The Breakthru 286 is undisputedly the fastest turbo board with the biggest bang for the buck. And we include FREE the $89.95 acclaimed Lightning software, which complements the Breakthru 286 by dramatically speeding up disk operations.

But an ad can't let you experience it for yourself. That's why we sell either BREAKTHRU 286 8MHz or 12MHz on a 60-day trial. If you aren't completely satisfied return it within 60 days for a full refund. Call today with your MasterCard, Visa, American Express or COD instructions and we will ship your card the very next day.

(214) 351-0564
11035 Harry Hines Blvd.
Suite 206
Dallas, Texas 75229

VISA

CIRCLE 489 ON READER SERVICE CARD

The initial problem was so serious that the Kyocera modems could not handle *Smartcom* at all. To ensure maximum compatibility, be certain the serial number on your Kyocera begins with 5Z.

**BUNDLED SOFTWARE** The Kyocera modems can come bundled with *Microsoft Access* (and a cable). *Access* is a fine communications program, offering that delicate balance between ease of use and performance. But I can go to a store and buy *Access* for about the difference between the bundled and unbundled prices. So you'll save a little less than the cost of an RS-232C cable, assuming you don't already have one.

I can't begin to scold Kyocera enough for the absence of an index in its manual, but otherwise the friendly little document is interesting, informative, and, well . . . almost precious. The manual is geared toward the uninitiated user. It uses careful diagrams and simple explanations; there's even a note reminding you to congratulate yourself once the modem is successfully connected.

In a few instances, the manual and the telephone support are misleading. The manual states that the modem includes a test used to confirm whether the data being sent is "transmitted without error." You might deduce that the Kyoceras have error correction, but they don't. The reference is to the self-test. On the phone, Kyocera boasted that, unlike Hayes, they offer a true busy-signal detect. After further grilling, it came out that the only Hayes modems lacking true busy-signal detect were the original 300-bps Smartmodems. On the plus side, Kyocera does offer customers a toll-free hot line.

The Kyoceras performed moderately well in all but PC Labs worst-case line noise test. In the worst-case scenario, they simply failed to detect the presence of a carrier at all. As the signal-to-noise ratio got better, they finally did detect a carrier but could not transmit properly. While the test results are slightly upsetting, my long-distance dialing encounters with the modem, even through non-AT&T service, proved uneventful, and my transmission of files was error-free.

Reviewers should try to stir up some passion, be it love or hate, for their products before writing any closing paragraphs. In this case, perhaps no strong feelings are warranted. The Kyocera KM1200S and KM1200D perform passably at a middle-of-the-road price, straying moderately from the Hayes path, but with good intentions.—**Robin Raskin**

## Leading Edge Products Inc.

Leading Edge Products seems to have put a lot of thought into the design of its modems. (Actually, OmniTel designed and manufactured these modems, which are identical to its own except in the noise tolerance testing.) You get plenty of features and you get a very good communications package, too. The boards seem well made, with no loose connections or sloppy solder jobs. And as with all Leading Edge products I have seen, you get nicely typeset, bound documentation that is thorough enough for beginners.

The internal 300/1,200-bit-per-second modem is compatible with the Hayes Smartmodem 1200B and with Leading Edge computers, IBM PCs, and compatibles. It supports tone or pulse dialing; COM1, COM2, COM3, and COM4 ports; manual and automatic dialing and answering; and automatic speed and parity detection. *Bit Com* communications software and a phone cable are included.

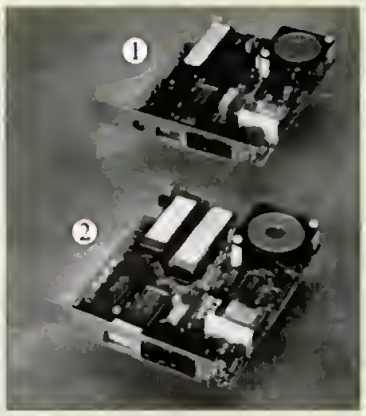
I don't usually run into problems installing a modem, but this one was different. Before opening the cover of my XT, I compared the DIP switch settings in the manual and on the board and I checked the positions of the jumper pins (which rarely require repositioning). Everything looked good, so I removed my IBM async adapter card and replaced it with the Leading Edge Model L Series 1200B. I then inserted the phone jack into the back of the modem and closed the cover on the XT. Physically, that's all there is to installation.

The last step in the setup procedure is to install the *Bit Com* program, which requires nothing more than copying all the files from the single floppy disk to your working disk. Finally, I booted the computer and started *Bit Com*. The modem comes configured for COM2, which was fine with my system, so I changed the default COM port in *Bit Com* to COM2. Expecting instant results, I dialed up MCI Mail, but *Bit Com* wouldn't dial. The message came back that COM2 was not functional. To reassure myself I exited to DOS and executed the mode command to initialize COM2. DOS had no problem.

I read through the manual. Twice. But I could not find the problem. I tried dialing with several other communications programs, but none worked. After half an hour of frustration (it was Sunday and I could not call Leading Edge), a suspicion crept over me. The manual indicates that

PC MAGAZINE FACT FILE

**Leading Edge Products Inc**
21 Highland Circle
Needham Heights, MA 02194
(617) 828-8150




*Leading Edge's OmniTel-designed modems don't work in a short XT slot.*

① **Leading Edge Model L Series 1200B**
**List Price:** $149.95
**Requires:** Half-length slot
**In Short:** An internal, half-card 1,200-bps modem that won't operate in a short XT slot. Performance is average
CIRCLE 466 ON READER SERVICE CARD

② **Leading Edge Model L Series 2400B**
**List Price:** $289
**Requires:** Half-length slot.
**In Short:** An internal, half-card 2,400-bps modem that won't operate in a short XT slot. The price is high in light of below-average performance results at 2,400 bps
CIRCLE 465 ON READER SERVICE CARD

the half-length modem card will work in "any slot." Well, it does not work in the short slot of an IBM PC-XT. I moved the modem to another empty slot (full-length) and the problem was solved. I don't care what Leading Edge has to say about this—there are just too many users who will fall into this trap not to have mentioned the problem in the manual.

The Leading Edge modems have a volume screw on the rear panel. You can imagine the convenience of this detail.

Otherwise, it is extremely easy to get this product up and running. An analog loopback test is built into the modem, allowing you to communicate with the modem while it is isolated from the telephone line. Using this test, you can determine problems without going on-line.

The rear panel of the modem is well designed, with a jack for both phone and line, a small window for accessing the DIP switches once the modem is installed, and a unique feature that I feel should be standard on all internal modems: a volume screw right on the rear panel. You can imagine the convenience of this detail.

**AT IS OK?** The Model L Series 1200B fully supports the Hayes auto-dialing command protocol, with one very strange exception: if you type ATJUNK (or AT followed by any other combination of nonsensical digits), you do not receive the expected error message. Instead, the software responds with OK. I didn't know what to make of this, but all other commands worked as anticipated so it can't represent a problem.

The noise tolerance level of the Model L Series 1200B could be a lot better. While it performed okay on the first four levels, it could not transfer files without error on the last two. This is unacceptable in an otherwise high-quality product. If your telephone lines are very clean, this factor is not very important. But if you get a lot of noise on your lines, you'll want better tolerance than you get from the Model L Series 1200B.

I am happy to report, however, that this modem comes with a superb user manual, which not only walks you through the installation and troubleshooting aspects of getting on-line but provides a glossary of terms and plenty of appendixes for the technically minded user. Approximately half the manual is devoted to the modem itself, and the other half to operation of the *Bit Com* program.

*Bit Com* is a powerful and easy-to-use communications program, entirely menu driven. Selecting communications parameters is trivial, a matter of filling in the blanks on a screen form. Default settings appear on the form, and you may change any of them by moving the highlight bar to it with the Cursor Up and Cursor Down keys and then cycling through the potential choices with the Cursor Right and Cursor Left keys. It's a neat and clean menu system. To dial a phone number, you simply position the cursor next to its name on the list and press the D key. In short, the inclusion of *Bit Com* with any modem is a big plus in its favor.

There are very few differences between this 2,400-bps model and the 1200B, so this review will address only those features of the Leading Edge Model L Series 2400B that are different. To the naked eye from a distance of 10 feet, the two modems appear to be identical. Both are true half-length cards; unfortunately, this modem doesn't work in the short slot of an IBM PC-XT either. It fits, but it doesn't work. Also, this model doesn't have the volume control screw on the rear panel of the board; instead, you change volume through software.

The greatest difference between the two models, of course, is their maximum speed. This modem runs at 300, 1,200, or 2,400 bps. In PC Labs noise tolerance tests, neither Leading Edge modem received great scores. The Model L Series 1200B could not transmit at all during the last two tests. The Model L Series 2400B was able to transmit all six tests at 1,200 bps with fairly good scores, but at 2,400 bps it could only transmit the first three, and those produced poor scores.

Considering this performance, I don't think the price is low enough to attract me as a potential customer for either modem.—**Phil Wiswell**

## Migent Inc.

Besides coming up with an elegant and logical solution to getting an external modem off the desk and out of the way, Migent may have also created the next big technological status symbol.

Only 5 inches long, 2½ inches wide,

PC MAGAZINE FACT FILE

**Migent Inc.**
865 Tahoe Blvd
Incline Village, NV 89450
(702) 832-3700

*Migent's modem is a traveler's dream: tiny, rugged, and battery-powered.*

**Migent Pocket Modem**
**List Price:** $259
**Requires:** External modem, serial port with male 25-pin RS-232 connector or optional AT-style 9-pin adapter cable.
**In Short:** The Pocket Modem is a full-featured, portable modem that can be carried in a shirt pocket. Besides its value to users with more than one PC, the Pocket Modem has the potential to become a technological status symbol.

CIRCLE 402 ON READER SERVICE CARD

and ⅝ to 1¼ inches thick, the Migent Pocket Modem is just the right size to stuff in a shirt pocket or to cram into a corner of a bulging briefcase.

Externally, the modem has five distinctive features: an integral female 25-pin RS-232 connector at the front end, a battery compartment near the other end, two phone jacks and a transformer plug on the rear, and a bright, screaming-orange plastic body in between. No status lights. No speaker.

Internally, the Pocket Modem displays a sophisticated combination of traditional pin-and-hole mounted and nontraditional surface-mounted components. Everything is securely attached. There are no wires or other components that are likely to come loose as the modem is knocked around during its travels.

The modem's thick orange plastic case is just as rugged as its circuitry. It's obviously designed to protect the modem from just about anything short of a steamroller. During testing, the Pocket Modem was knocked off desks, tossed onto the floor, and virtually slam-dunked from a height of 6 feet. The case remained unscratched and the modem continued to work perfectly.

Setting up the Pocket Modem for use is as simple as plugging it into the first available serial port. The connector on the modem's end mates directly with any male 25-pin RS-232 connector. An optional 18-inch 9- to 25-pin cable is available from Migent to adapt the modem to AT-style serial ports. It wasn't even necessary to attach the modem to an AC wall plug since the modem is powered by a 9-volt alkaline battery.

However, both a line to the wall jack and a line to a telephone had to be plugged into the modem's jacks. The modem will not operate unless a phone is attached. The fact isn't mentioned in the accompanying user manual until you get into the troubleshooting section. Any other set up or configuration is handled via software.

The user manual is weak and incomplete. Hopefully it's only a temporary fill-in until a better version is finished. Functionally, the Pocket Modem is Hayes compatible. In subjective tests it responded correctly to a full set of standard Hayes commands at both its rated speeds: 300 and 1,200 bps.

The modem has all the standard features that users have become accustomed to, including auto-answer, auto-dial and auto-redial.

The modem appeared to work perfectly with *Smartcom II*, *PC-Talk III*, and *Bit Com*, the communications package Migent is currently bundling with the unit. The modem needed a little minor reconfiguration to be completely compatible with *Crosstalk XVI*.

In PC Labs tests, the Pocket Modem worked very well in average conditions. However, it exhibited a marked sensitivity to noisy long-distance lines. It was able to handle the line noise but had to strain.

The Pocket Modem is perfect for someone who uses two PCs, one at the office and one on the road. When used with a laptop, the Pocket Modem has the additional advantage of running off its own battery. Similarly, business travelers can carry one with them just in case the equipment they encounter at their destination isn't equipped with a modem.

In permanent desktop installations, the modem could also do a good job of recovering some lost desk space.

**—Walt Rowinsky**

## Multi-Tech Systems Inc.

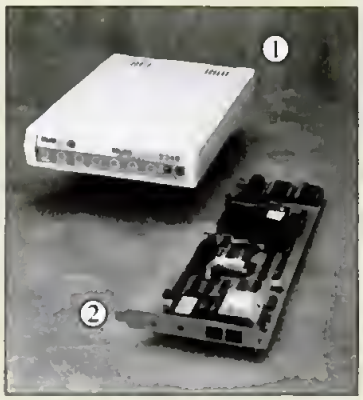
Multi-Tech Systems of New Brighton, Minnesota, has been making modems for mainframes and minicomputers since 1970. Today it also makes a line of Hayes-compatible modems for PCs, ranging in price from $299 to $649.

We looked at two Multi-Tech Systems modems: its top-of-the-line desktop model, the 300/1,200/2,400-bit-per-second Multi-Tech MultiModem224E, which retails for $649, and its top internal modem, the 200/1,200/2,400-bps Multi-Tech MultiModem224EC, which sells for $599.

Both modems respond to the Hayes Smartmodem 1200 command set, which allows them to work with most major communications software. They both turned in first-rate performances in our line-noise tests, indicating a very high resistance to line noise. In addition, they both offer MNP (Microcom network protocol) error correction. This hardware-based error-detection method, originally developed by Microcom, is activated when two MNP-equipped modems exchange data. Like software-based error-detection protocols such as Xmodem, MNP involves sending data in coded blocks. If the receiving modem detects an error, it instructs the sending modem to transmit the block again. MNP error detection operates much faster

### PC MAGAZINE FACT FILE

**Multi-Tech Systems Inc.**
82 Second Ave. SE
New Brighton, MN 55112
(800) 328-9717
(612) 631-3550




*The MultiModem224E makes it easy to change from voice to data transmission.*

EDITOR'S CHOICE

① **Multi-Tech MultiModem224E**
**List Price:** $649
**Requires:** Serial port, serial cable.
**In Short:** This 300/1,200/2,400-bps desktop modem offers compatibility with the Hayes Smartmodem 1200 command set, plus a whole slew of extras including a fast, hardware-based error-detection protocol.
CIRCLE 694 ON READER SERVICE CARD

② **Multi-Tech MultiModem224EC**
**List Price:** $599
**Requires:** One full-length slot.
**In Short:** This 300/1,200/2,400-bps internal, full-slot modem offers most of the capabilities of its desktop sibling. However, it suffers from a hard-to-master communications program and inadequate printed documentation. The full manual comes on-disk.
CIRCLE 693 ON READER SERVICE CARD

# PROBLEM: There's just no easy way to move from one software program to another.

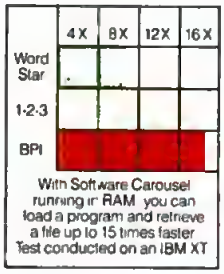
NOW FASTER, AND NOT COPY PROTECTED!

# THE SOFTLOGIC SOLUTION: Software Carousel™

**Now you can keep up to 10 programs loaded and ready to run.**

Hard to believe, but some people are happy with just one kind of PC software. Well, this is not a product for them.

But if you're someone who depends on many packages, all the time—someone who'd use several programs at once if you could, well now you can. With Software Carousel.



With Software Carousel running in RAM you can load a program and retrieve a file up to 15 times faster. Test conducted on an IBM XT

**Why call it "Software Carousel"?**

In some ways, Software Carousel works like the slide projector you're used to. You load a handful of pictures, view one at a time, then quickly switch to another. A simple idea, with powerful possibilities for computing.

Here's how it works. When you start Software Carousel, just tell it how much memory you have, load your software and go to work.

Need to crunch numbers? Switch to your spreadsheet. Need your word processor? Don't bother saving your spreadsheet file. Just whip over to your document and do your work. Snap back to your spreadsheet, and it's just like you left it.

With up to ten different programs at your fingertips, you'll have instant access to your database, communications, spelling checker, spreadsheet, word processor, RAM resident utilities, languages, anything you like.

**Reach deep into expanded memory.**

This could be the best reason ever for owning an expanded memory card, like the Intel Above Board, AST RAMpage, or any card compatible with the L/I/M Extended Memory Standard.

Software Carousel puts programs into this "high-end" memory for temporary storage when they're not in use. And switches them back out when you want them. It's fast, efficient, and easy.

If you want, Software Carousel will even use your hard drive for swapping. Just allocate a portion for storage, and go to work.

**Sidekick, Superkey and Ready. All at the same time.**

You know what happens if you try loading two or more RAM resident utilities at once. You get crashed keyboards, frozen screens, all kinds of interference between programs fighting for control.

With Software Carousel, you can have as many accessories and utilities on-tap as you want. Just load different ones in different Carousel partitions. Since they can't see each other, they can't fight.

**The easy way to maximize PC power.**

With all this power, you might think Software Carousel is complicated and difficult to use. Not so. Particularly when you compare it to other programs like Windows and TopView.

Set it up once and Software Carousel remembers forever. Better still, Carousel will look for the programs you use most often and optimize them for quickest access.

The way we see it, there are certain things you have a right to expect from your computer. Access to your software is one of them. At just $59.95* a copy, Software Carousel is the best way to get it.

See Software Carousel at better computer dealers everywhere. Or order today by calling 800-272-9900 (603-627-9900 in NH), or mail the coupon below. If you find this product does not meet our advertised claims within 30 days of purchase we will arrange for a prompt refund.

## Software Carousel $59.95*

YES! Send me____ copies of Software Carousel at just $59.95* each.

Name_____

Company_____

Address_____

City_____ State/Zip_____

Check Enclosed ☐ VISA ☐ MC ☐ AMEX ☐

Card #_____ Exp. Date_____

Signature_____

SoftLogic Solutions, Inc.
530 Chestnut Street
Manchester, NH 03101
800-272-9900
(603-627-9900 in NH)

SOFTLOGIC SOLUTIONS

## Call today: 800-272-9900

*plus $5.00 shipping and handling.

CIRCLE 288 ON READER SERVICE CARD

than software-based error detection and operates automatically, without user intervention. Multi-Tech also sells identical modems without the MNP feature, retailing for $50 less than the MNP-equipped models.

The desktop MultiModem224E measures a compact 7.3 inches by 11 inches and is only 1.6 inches high, allowing it to fit unobtrusively under a desktop telephone. It comes with a wall-mounted transformer, a power cable, and a telephone cable. You have to provide the serial cable, however. The modem also has two phone jacks, hence you can plug your telephone into the modem line.

The MultiModem224E comes in a beige plastic case that harmonizes with IBM's basic gray; it sports a set of seven front-panel LED indicators that report on the progress of your call and the speed of data transmission. If the speed lights blink off and on, you know that MNP error detection is underway.

Two switches on the front panel allow you to dial phone numbers manually from a handset telephone and then switch to data transmission. This is handy if you wish to use the line for voice communications and then initiate data transfer. The power switch is located inconveniently in the back of the modem, as is the volume control, which must be adjusted with a screwdriver.

If you're ready to accept the manufacturer's default switch settings, installing the MultiModem224E is simply a matter of plugging the power, telephone, and serial cables into the right sockets. Then you turn on the modem, power up your communications software, and you're ready to go. If your communications software refers to the switch settings on the Hayes Smartmodem 1200, you can just turn over the MultiModem224E to adjust an identical set of switches. Another switch box is located inside the modem's case. For most applications, you won't need to adjust those switches, but if you do, the manual gives clear directions for opening the case and setting the switches.

**INTERNAL PHONE DIRECTORY** In addition to mimicking the Hayes Smartmodem 1200 command set, the MultiModem224E has its own command set which lets you access extra features, such as the modem's internal telephone directory. These commands are terse and cryptic, beginning with the familiar Hayes AT command and followed by some additional symbols. For example, the command ATDT2126960360N0 would tell the modem to store the number for the PC Magazine's Interactive Reader Service (PC-IRS) in its directory. Then you could dial the PC-IRS by typing the command ATN0. The directory, which can store up to ten phone numbers, is located in nonvolatile memory powered by a lithium battery, so the phone numbers don't disappear when you turn off the modem. Since the battery-powered memory also stores your default parameter settings, you don't have to set the parameters afresh every time you use the modem.

The MultiModem224E has its own command set, which lets you access extra features, such as a telephone directory.

The MultiModem224E also has the ability to sense dial tones and busy signals; hence it can react to those tones rather than wait for a predetermined period of time. This allows the modem to do some interesting tricks. For instance, if you have several alternate phone numbers for the same computer, you can instruct the modem to try each number, going on to the next if it detects a busy signal.

Because some of the MultiModem224E's commands are unique to Multi-Tech products, most off-the-shelf communications programs won't include menu options for them. So, to take advantage of these features, you'll have to either use the AT commands directly in your software's terminal mode or invoke the unique commands with software macros.

The MultiModem224E has a number of features of special interest to corporate users. It can communicate synchronously at 1,200 and 2,400 bps, and, with the flick of two DIP switches, it can be used with leased lines.

Multi-Tech's MultiModem224EC is the internal board version of the desktop MultiModem224E. This full-slot modem comes with two jacks so that you can easily connect your telephone handset to the modem. By setting DIP switches, you can configure the modem as COM1, COM2, COM3, or COM4. Another set of DIP switches controls operation of MNP error detection. To figure out how to set these MNP switches, you have to play detective because the slim printed manual contains only a very abbreviated description of MNP. To get the full scoop, you must find the proper passage in the on-disk documentation that comes with the modem. Multi-Tech doesn't recommend that you print this out before you install your modem, but if you want to save some confusion, it's a good idea.

You won't have this problem with the desktop modem, which comes with the full manual in printed form. And a Multi-Tech representative promised that internal modem purchasers who want the full printed manual will soon be able to purchase the document from Multi-Tech.

Once you figure out how to set the MNP switches, installing the modem is simply a matter of slipping the board into a vacant expansion slot and turning the requisite screws.

**COMMUNICATIONS SOFTWARE** The MultiModem224EC comes with Multi-Tech's communications software package, *MultiCom PC*. This program takes over a number of the functions that the desktop model performs through hardware. For instance, *MultiCom PC* has a telephone directory that stores up to 20 telephone numbers and log-on sequences on-disk. The program also keeps track of communications parameters, including your instructions for using the MNP protocol. These instructions can override the DIP-switch settings to turn MNP on and off or command the modem to try to detect the presence of an MNP modem on every phone call.

# PROBLEM: The more experience your hard disk has, the harder it has to work.

# THE SOFTLOGIC SOLUTION: Disk Optimizer™

NOW FASTER, MORE POWERFUL AND NOT COPY PROTECTED!

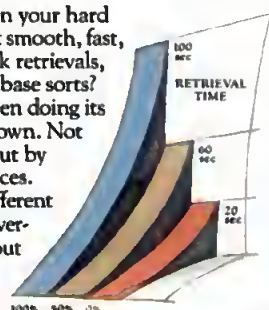
**Your hard disk will run faster when it's not chasing around after files.**

Remember the old days when your hard drive was new? Remember that smooth, fast, slick performance? Those quick retrievals, rapid saves, lightning-like database sorts?

Well ever since, DOS has been doing its best to slow your hard drive down. Not by slowing down the motor, but by breaking your files up into pieces. Storing different chunks in different places. Data files, programs, overlays and batches that started out in one seamless piece are now scattered all over.

Loading is slower. Sorting is slower. Retrieving, backing-up. Everything takes longer because your disk has to work harder.

Problem is, it's something that happens so gradually you may not notice the difference. At least, not until you see the dramatic improvement after using Disk Optimizer.



The more fragmented your files get, the longer they take to retrieve

**File fragmentation—It's a problem you can see.**

Watch your hard drive the next time it reads or writes a file. Each "blip" of the LED means the drive-head is moving to another place on the disk—either to pick up or lay down another chunk of data.

And the truth is, head movement takes time. Far more time than actual reading and writing. What's worse, all this head movement causes extra wear and tear that can shorten the life of your drive.

**Disk Optimizer—Tunes up your disk by cleaning up your files.**

Disk Optimizer works by finding all the scattered pieces of your files and putting them back together where they belong. Next time your drive reads it, there's just one place to look.

And the results are often dramatic. Reading and writing times may be cut by as much as two thirds. Database sorts that used to take hundreds of head moves now proceed quickly and efficiently. And since head movement is now at an absolute minimum, your disk drive will lead a longer, more productive life.

**Analyze, scrutinize, optimize.**

Before you optimize, you'll probably want to analyze. So Disk Optimizer shows you, in percentages, how much fragmentation has taken place—on the entire disk, in individual directories, or for groups of files you specify using global or wildcard names.

Plus, there's built-in data security that lets you assign passwords to as many files or file groups as you want.

And the File Peeker gives you an inside look at the structure of files. It's a great way for non-programmers to learn more about computers and a powerful tool for professionals who want to analyze the contents of their disks.

**Get your hard disk back in shape—with new improved Version 2.0**

Hard to believe, but new Disk Optimizer Version 2.0 is even better than before. Not only will it optimize your disks in far less time than it used to, but it actually speeds up rettievals even more by letting you give priority treatment to your most used files, like programs and batches.

When you think about it, it's simple. The longer you own your hard drive, the more you come to depend on it. But the longer you wait to get Disk Optimizer, the less performance you'll get.

Use it just once and discover what thousands of satisfied PC users already know—$59.95* is a small price to pay to restore the speed and performance you count on.

See Disk Optimizer at better computer dealers everywhere, or order today by calling SoftLogic Solutions at 800-272-9900 (603-627-9900 in NH). Or mail the coupon below.

## Disk Optimizer $59.95*

YES! I want to put the zip back in my hard disk.
Send me ____ copies of Disk Optimizer right away.
Name _____
Company _____
Address _____
City _____ State/Zip _____
Check Enclosed ☐ VISA ☐ MC ☐ AMEX ☐
Card # _____ Exp. Date _____
Signature _____

SoftLogic Solutions, Inc.
530 Chestnut Street
Manchester, NH 03101
800-272-9900
(603-627-9900 in NH)

SOFTLOGIC SOLUTIONS

## Call today: 800-272-9900

#6

*plus $5.00 shipping and handling.

CIRCLE 334 ON READER SERVICE CARD

# Why Does Chrysler Use Telenetics Modems In Its Data Networks?

2400 bps
Pony Express

2400 bps
half-card
for PC

Chrysler Corporation uses Telenetics modems in its dial-up data networks. Chrysler demands technical performance such as throughput and accuracy, of course. But support and service performance is every bit as important. Telenetics meets those requirements.

- Better Performance — more throughput, greater accuracy and higher reliability
- First 2400 bps Modem Approved for IBM PC
- 5 Year Warranty, we're better and we prove it

For a bad phone line, you need a good modem! If your dealer doesn't have Telenetics modems in stock call 1-800-826-6336 (in California 800-822-4267) for more information or the name of your local dealer/distributor.

**Telenetics™**

895 E. Yorba Linda Blvd., Placentia, CA 92670
(714) 524-5770

CIRCLE 112 ON READER SERVICE CARD

Although the printed manual will get you started using *MultiCom PC*, you'll have to refer to the on-disk manual for detailed instructions. And, while the program offers the usual array of communications features—such as the ability to send and receive files and emulate a number of popular terminals—it is difficult to master. Although *MultiCom PC* is a command-driven program with a great deal of flexibility and power, it suffers from an overly brief tutorial and documentation that leaves out vital pieces of information. For instance, the manual neglected to mention that macro commands must be separated by commas; hence it took me six tries to get a working macro for signing on to MCI Mail.

Nonetheless, the internal MultiModem224EC is an impressive offering. Like its sibling, the desktop MultiModem224E, the internal MultiModem224EC improves on the Hayes Smartmodem 1200 standard by providing extras like the ability to sense dial tones and busy signals, plus a set of handy diagnostic commands.

With their high immunity to line noise and the extra advantage of MNP error correction, both of these modems should do a fine job of managing fast, error-free data communications.—**Dara Pearlman**

## Natural Microsystems Corp.

Natural Microsystems Corp. has developed a genuinely unique product known as the Watson. More than just a modem, the Watson also acts as an electronic-voice mail system, recording audio messages on-disk for later retrieval. Nonetheless, the Watson is capable of operating as a 1,200-bit-per-second modem, hence its inclusion in this review.

The Watson comes as a particularly well-made full-length board. The component count seems rather high at first, but remember, this is not just a simple modem. Some of this circuitry converts analog voice input into digitized recordings.

Lacking from the board is a speaker to monitor line activity. Instead, a ⅛-inch jack allows connection to an external speaker. This seems reasonable, as it is unlikely that anyone would want to try to listen to their voice messages over a tiny speaker buried deep within a PC enclosure. Also on the rear mounting strap are connections for the phone and line cords. Although not interchangeable, they are clearly marked.

A bank of six DIP switches controls such functions as communications port (only two are supported), data terminal ready and carrier detect signals, and the I/O address space utilized. Operationally, the Watson can emulate a Hayes Smartmodem 1200B but in a manner different from most. Rather than putting the Hayes instruction set in the board's ROM chips, Natural Microsystems provides the instruction set in a file named Wmodem.

Executed from the DOS command prompt, Wmodem will ask for the name of the communications program you wish to run. Both Wmodem and the communications program must reside in the same subdirectory. Alternatively, Wmodem may be installed as a memory-resident utility using the /S start-up option. In this mode, the program eats up about 12K bytes of precious RAM. A terminal program may then be run from any subdirectory. To its credit, Wmodem caused no problems when loaded with Borland's *SideKick* and several other memory-resident programs.

Other start-up options are available, which can enable a series of "debugging lights" in the upper-right-hand corner of the screen to monitor the status of the RS-232 serial port lines, enable or disable modem emulation, and test the altemate I/O address space in the event that Watson conflicts with another device using the same addresses.

Included on one of the two disks supplied with Watson is a slightly modified version of *PC-Talk III* (curiously renamed MODEM.EXE), the ancient shareware communications program. While certainly adequate for transferring files to and from a bulletin board or mail system, it lacks many of the features found on newer products, such as terminal emulation or script files. In the event that a more powerful package is required, the Watson also proved compatible with several more-recent communications packages, such as *Crosstalk XVI*.

The Watson and Wmodem appear to be fully compatible with all of the Hayes AT commands sent to it. Line-noise resistance tests could not be performed on Watson because it fills two COM ports, making it incompatible with PC Labs modem testing apparatus.

The documentation is supplied as four manuals in a single half- size three-ring binder. Although the text is complete and easy to understand, the index and table of contents were rather scanty, making it difficult to locate information quickly.

Natural Microsystems offers a number of options for further increasing Watson's utility. The most popular of these is the Voice Information System, which allows the Watson to dial out from a dialing directory, transmit a voice message, and record a response. Other packages are tailored for

PC MAGAZINE FACT FILE

**Natural Microsystems Corp.**
6 Mercen Rd.
Natick, MA 01760
(617) 655-0700

*More than a modem, the Watson is also a unique electronic-voice mail system.*

**Natural Microsystems Watson**
**List Price:** $498
**Requires:** 256K RAM, one full-length slot, one disk drive, DOS 2.0 or later. Hard disk optional.
**In Short:** An unusual and highly versatile electronic-voice mail system that can do double-duty as a Hayes-compatible 1,200-bps modem.

CIRCLE 613 ON READER SERVICE CARD

several specific business applications.

In all, the Watson is a unique and highly specialized communications product. The ability to act as a modem as well is merely icing on the cake.—**Frank Bican**

## Novation Inc.

One of the first makers of modems for microcomputers, Novation, of Chatsworth, California, has recently fallen on hard times. Last fall, the company went to bankruptcy court to file for Chapter 11 protection, and since then, according to vice president Geoffrey Groom, it has changed direction, relying less on large OEM contracts and more on retail sales.

Groom insists that Novation is basically sound and that prospective buyers needn't fear that the company will not be around to offer service and honor its warranties. Nevertheless, the shadow remains, and the buyer should be aware of Novation's difficulties before taking the plunge.

Sadly, the disarray at Novation is not confined to fiscal and organizational matters. We reviewed four of Novation's Hayes-compatible modems and found that, while they performed their basic functions very well, they all suffered from documentation errors, and three of the modems had minor bugs.

Our engineering contact at Novation always had a plausible reason for the problems we encountered, ranging from "We decided not to implement that feature after the manual was printed" to "That's a known bug, and we can send you a new IC with a fix." Nonetheless, because these problems were so numerous, it was hard to escape the conclusion that Novation's product line could also benefit from some reorganization.

However, since Novation promises to fix your problems promptly and free of charge, there's still a good argument for considering these modems, especially in light of their fine performances on our line-noise tests. Novation's top-of-the-line Professional 2400 modems were outstanding performers in PC Labs tests, competing respectably with products from companies like IBM and IDEAssociates. And Novation's less expensive 1200 XE modems also made an above-average showing in the noise-resistance tests. What's more, all

### FACT FILE

**Novation Inc.**
20409 Prairie St.; Chatsworth, CA 91311; (818) 996-5060

*All the Novation modems we tested suffered from minor bugs, but they are still worthy of consideration by virtue of their fine performance in our line-noise tests.*

① **Novation 1200 XE**
**List Price:** $229
**Requires:** Serial port, serial cable.
**In Short:** This 300/1,200-bps desktop modem provides basic Hayes-compatible functionality at an affordable price. Additions to the standard Hayes Smartmodem functions include the ability to sense dial and busy tones and to dial several alternate numbers if the first number is busy. Also included is *ProComm*, a powerful shareware communications program.
CIRCLE **673** ON READER SERVICE CARD

② **Novation 1200 XE Half Card**
**List Price:** $159
**Requires:** One half-length slot.
**In Short:** This Hayes-compatible half-card modem offers most of the functions of the desktop 1200 XE, including *ProComm*. However, its inaccurate manual can cause confusion during installation.
CIRCLE **672** ON READER SERVICE CARD

③ **Novation 2400 Professional**
**List Price:** $750; with *Mite* communications software, $795.
**Requires:** Serial port, serial cable.
**In Short:** This slim, lightweight desktop modem offers synchronous communication at 1,200 and 2,400 bps and asynchronous communication at 300, 1,200 and 2,400 bps. Although flawed by an out-of-date manual, the 2400 Professional is fully Hayes compatible and offers some attractive extras, such as a signal-quality indicator and the ability to dial alternate phone numbers when it senses a busy tone.
CIRCLE **671** ON READER SERVICE CARD

④ **Novation 2400 Professional Half Card**
**List Price:** $549
**Requires:** One half-length slot.
**In Short:** This 300/1,200/2,400-bps internal half-slot modem offers most of the capabilities of the desktop 2400 Professional. It comes bundled with *Mite*, an adequate but not outstanding communications package. Inaccuracies and omissions in the modem's manual can cause some confusion.
CIRCLE **670** ON READER SERVICE CARD

of these modems passed our Hayes-compatibility tests, with some minor exceptions. So, your communications software is likely to have little trouble controlling the Novation modems.

**BEST PERFORMER** The company's best performer is the Novation Professional 2400, a desktop modem that offers synchronous communication at 1,200 and 2,400 bps and asynchronous communication at 2,400, 1,200, and 300 bps. Slim and lightweight, the Professional 2400 is only slightly bigger and heavier than its paperback manual. It stands only an inch high and measures 5½ inches wide by 10½ inches deep. The top of the modem slopes slightly in the front, creating room for a set of control buttons and an elegant LCD display. Besides the usual on/off, speed, originate/answer, and data/voice switches, there is a test switch that can activate a number of diagnostic tests, including the modem's usual power-on self-test.

The LCD display reports on the modem's data transmission speed and its various modes; it also lets you know when data is being received or sent. In addition, a signal-quality indicator lets you know how much extraneous noise is dirtying up your phone line. If you have a particularly bad line, you can hang up and try to connect again. A small dial on the modem's side controls volume.

The modem's slightly out-of-date manual may cause some confusion during installation, although a Novation representative promises that a new manual will soon be packaged with the Professional 2400. The manual leads you through the process of connecting the requisite cables and then directs your attention to a nonexistent set of DIP switches. These switches have been replaced by a set of software commands that are described in an addendum to the manual. You have to get your communications software talking to the Professional 2400 in order to use these Hayes-like AT commands. However, once you get your software running, you can enter commands such as AT&L1, which prepares the modem for use with a leased-line network. You can then make these new options permanent by storing them in the modem's nonvolatile memory. This nonvolatile memory can also hold a frequently used telephone number, which you can dial with another AT command.

Besides mimicking the features found in Hayes Smartmodems, the Professional 2400 offers a number of extras. It can require incoming callers to give a password, and it can sense dial and busy tones. Although the modem does not offer a redial-until-connect command, it will redial a busy telephone number a specified number of times. It can also string a series of telephone numbers together, dialing a new number when it encounters a busy signal. This last feature didn't work in the first Professional 2400 we tested. However, Novation rushed us a corrected plug-in firmware module that resolved the problem quickly.

Novation's top-of-the-line Professional 2400 modems were outstanding performers in PC Labs tests.

**LOWER-COST HALF-CARD** The $549 Novation Professional 2400 Half Card is the board version of the $750 desktop Professional 2400. Although it cannot communicate synchronously and lacks the desktop modem's elegant display panel, the Professional 2400 Half Card offers most of the functionality of its bigger brother at a significantly lower price.

The Professional 2400 Half Card is quite a marvel of modern modem miniaturization, squeezing all of the electronics for 2,400-bps communications onto a circuit board that's no larger than your hand. The back panel of the board includes two well-labeled tilephone jack sockets and a volume control knob. You can select either COM1 or COM2 simply by moving a pair of jumper connectors. Then you pop the board into a vacant expansion slot, and you're ready to put your PC on-line.

When you power up your PC, you'll hear a chorus of beeps and chirps indicating that the Professional 2400 Half Card is performing its power-up self-test. Like the desktop model, the Half Card is fully Hayes compatible and offers a similar array of extra features, including the ability to store default parameters in nonvolatile memory and the ability to string together a series of telephone numbers.

Although the manual is in most respects clear and full of helpful examples, it can lead you astray from time to time. For example, the manual says that the Half Card, like the desktop model, can store a telephone number in its nonvolatile memory. However, you will try in vain to get this feature to work. Novation decided not to include this feature but didn't update the manual to reflect the change.

Another glitch because of poor documentation surfaced during PC Labs Hayes compatibility tests, when the Professional 2400 Half Card refused to respond to the Hayes ATX command—a rather obscure command that governs the modem's ability to mimic different modems in the Hayes line. A call to technical support revealed that an undocumented command was necessary to solve the problem.

The Professional 2400 Half Card's base price includes *Mite*, Version 3.0, a communications software package from Mycroft Labs. *Mite* is also available as a $50 option for the desktop Professional 2400. A menu-driven program, *Mite* offers basic communications options such as the ability to dial telephone numbers and send and receive files. While it offers keyboard macros that invoke a series of keystrokes at the touch of a function key, this feature is less sophisticated than the automatic log-on macros found in many other communications packages.

*Mite* can also store a large number of telephone numbers and related parameters, each in a separate "parameter file." This is clumsier than the point-and-pick telephone directory approach seen in many other communications programs. For instance, to dial MCI Mail, you tell *Mite* to load the parameter file MCI.PAR. If you forget the name of your parameter file, you must go to *Mite*'s DOS window and look at your disk's directory. Other features in-

cluded in *Mite* are binary transfer protocols such as Xmodem and a password-protection scheme for incoming calls.

**THE LOWER-COST XE SERIES** In addition to its Professional series modems, Novation offers a line of lower-cost XE series modems for cost-conscious buyers with less demanding communications needs. We looked at the Novation 1200 XE desktop model, which sells for $229, and the Novation 1200 XE Half Card, which retails for $159. The company also

Novation offers a line of lower-cost XE series modems for cost-conscious buyers.

sells 2,400-bps versions of these XE modems, priced at $299 for the board version and $499 for the desktop model.

The desktop 1200 XE has the same slim profile and light weight of the pricier Professional 2400. Its controls are identical, including the volume control dial. But instead of the elegant LCD, you get a series of LED indicators to keep you abreast of the progress of your call.

Installation is a simple matter of plugging in a power cord, a serial cable, and a pair of phone cables. If you want to change the modem's default options, there is an easily accessible set of DIP switches on the back panel of the modem.

When you turn on the modem, the LED indicators will blink on and off for about 5 seconds, indicating that the modem is performing its power-on self-test. Like the Professional Series modems, the XE modems offer a variety of loopback testing options that can check the performance of your modem, a remote modem, and the line connecting the two.

The 1200 XE performed well in our Hayes compatibility tests, except for one minor instance where it gave an incorrect response code after it executed a command. Extra features include the ability to sense dial and busy tones, and the ability to dial several alternate numbers if the first number is busy.

The 1200 XE Half Card is so close to its desktop sibling in functionality that it shares the same manual. In general, the manual is clear and well written, but it suffers from the lack of an index and from several annoying inaccuracies. For instance, the manual describes some features the designers decided not to implement. Thus, neither 1200 XE modem offers the dialing command described in the manual that automatically senses whether the modem is using a touch-tone or pulse line. And, also contrary to the manual, only the desktop 1200 XE can automatically try alternate phone numbers if the first one is busy. The Half Card model lacks this feature.

More important, the manual doesn't tell users of the 1200 XE Half Card how to adjust the modem's volume. The manual refers to a nonexistent volume control dial on the Half Card's back panel. Instead, there is a jumper plug on the circuit board that selects either high or low volume. To find out where the jumper is, you'll have to call technical support. You also may have a bit of trouble matching the right telephone cable to the right jack plug because the two jack plugs on the back of the 1200 XE Half Card are unlabeled.

Like the desktop 1200 XE, the Half Card is fully Hayes compatible, with the additional ability to detect dial and busy tones to allow faster dialing and disconnects. However, the Half Card was unable to recognize the Sprint tone as a secondary dial tone, so I had to use Hayes-style timed pauses when dialing with a Sprint line.

**THE PROCOMM PROGRAM** Both of the 1200 XE modems are bundled with *ProComm*, a shareware-style communications program from PIL Software Systems of Columbia, Missouri. Like most shareware products, *ProComm* comes with an on-disk manual and opens with an advertising screen that urges you to become a registered user. Registration costs $35 and entitles you to program support, an authorized copy of the latest version, and notification of updates. For $50 you also get a printed copy of the manual.

Considering its shareware origin, *ProComm* is surprisingly powerful and easy to use. Similar in feel to the original shareware program, *PC-Talk*, *ProComm* uses Alt-key combinations as program commands and presents you with a command menu at the touch of a function key. Features include the ability to emulate a number of popular terminals, a dialing directory containing 100 entries, an automatic redial function, and several binary file transfer protocols including Xmodem and Kermit. It also offers a powerful macro language that can automate complete communications sessions, as well as the more usual log-on chores.

Despite the minor glitches and documentation errors, all four Novation modems perform their basic functions well. They are highly resistant to line noise and in almost all cases are fully Hayes compatible. Once Novation gets its act together and matches its manuals to its modems, it will have a superior product line indeed.—**Dara Pearlman**

## OmniTel Inc.

The OmniTel product line offers a variety of features at two price levels, $300 and $450. Based on my testing, OmniTel modems are very reliable (with one exception), and all can be used with OmniTel's *Bit Com* communications program or with any Hayes-compatible software. Only one of these modems is external—an alternative to the Hayes Smartmodem 1200. Of the three internal modems, one is actually a multifunction board loaded with options, as well as the 1,200-bit-per-second modem, so if you're looking for more than communications, this one board may solve many of your problems.

The *Bit Com* program is not bundled with the modems because so many people prefer to use a Hayes-compatible program. *Bit Com* costs $65 and is well worth that price if you haven't got access to more fully featured communications programs. It comes with the OmniPak and is described in the OmniPak review.

**BUILT LIKE A TANK** The Encore 1200LC external modem is a well-designed and sturdy piece of hardware that

# The Most Powerful LAN Fits on a Disk.

Network Power. You knew that someday there would be a powerful LAN that didn't need old-technology network boards. It would be fast, easy to install, and run 99% of PC-DOS software. It would be expandable, provide remote access, password-protection, and enable you to use inexpensive terminals as workstations in a PC-DOS environment.

Dream no more, because the power is here.

Its name is LANLink™

**A Software-Driven LAN Powerful Enough To Use RS-232 Ports for Network Communications.** In development for over three years, LANLink™ represents the next generation of local area networks. All of the logic which has traditionally resided on network boards is on LANLink's Satellite and Server Diskettes.

No additional hardware is required. Inexpensive serial ports replace "Kilobuck" Network Interface Boards making installation costs one-third that of a board-driven network.

**How To Configure a Smart Network...With Dumb Terminals, But Without Dedicated Servers.** Boasting a wide variety of configurations, LANLink™ is most often set up as a "Star" having up to eight satellites connected to a central, nondedicated server. Larger networks can have multiple servers, supporting a total of 73 or more network users.

R-LAN™ (Remote-LAN) gives users the ability to interact with a LANLink™ network in real time via modem. Plus, if MultiLink Advanced™ is run on a Satellite, inexpensive dumb terminals can be used to access network disks, files, and programs.

**99% of PC-DOS Applications Run in a Totally-Transparent Network Environment.** If you know DOS, you already know how to use LANLink™ COPY transfers files among users, and a 2-drive PC Satellite boots 1-2-3 from the Server's hard disk with the entry c:lotus. Each satellite's access can be limited to specific disks, printers, and sub-directories. A wide variety of software including Lotus 1-2-3, dBASE III, and WordStar 2000 is fully compatible. LANLink™ has a collision-free data transfer rate which exceeds 115,000 BPS.

**Power Up Your PCs Today.** For complete details and the authorized dealer nearest you, call The Software Link TODAY. The LANLink™ Starter Kit is $495 and includes modules for both a Server and a Satellite. For a limited time, 50 feet of shielded RS-232 cable will be included free of charge. Additional Satellite Modules are only $195, each.

LANLink™ is immediately available and comes with a money-back guarantee. VISA, MC, AMEX accepted.

See us at Booth #4626
COMDEX/Spring '87
Georgia World Congress Center

LANLink™

THE SOFTWARE LINK, INC.
Developers of LANLink™ and MultiLink Advanced™
8601 Dunwoody Place, Suite 632, Atlanta, GA 30338 Telex 4996147 SWLINK
CALL: 404/998-0700
Dealer Inquiries Invited

THE SOFTWARE LINK, INC./CANADA 250 Cochrane Drive, Suite 12 Markham, Ontario L3R 6B7 CALL 416/477-5480

LANLink™ MultiLink Advanced™ & R-LAN™ are trademarks of The Software Link, Inc
IBM, PC, & PC-DOS are trademarks of IBM Corp WordStar 2000, dBASE III, and Lotus 1-2-3 are trademarks of MicroPro, Ashton-Tate, and Lotus Development Corp., respectively

CIRCLE 393 ON READER SERVICE CARD

may be driven by OmniTel's own auto-dialer program or with Hayes-compatible software.

The modem is compatible with Bell 103 and 212A communications standards and can automatically or manually originate and answer calls. It is slightly wider than the Hayes Smartmodem, with a flat steel top on which a standard desk telephone sits firmly.

The sturdy front-panel features seven LED status indicators and no switches—nothing that can be broken off or damaged. A recessed rear panel contains the power switch, phone and line jacks, serial port, and a DIP switch panel.

If you think the Smartmodem is built like a tank, the 1200LC is built like a supertank. I tried shaking, dropping, and banging on the case while transmitting and receiving data, with no bad results.

Getting on-line with the Encore 1200LC is a snap, especially for PC owners, because the default settings needn't be changed. You plug the modem's hardwired power cable (which can't be pulled out of the modem) into an outlet, connect the RS-232 cable, plug in line and/or phone jacks, boot a communications program, and you are off and running in less than 5 minutes.

Just to make sure you don't get things connected incorrectly, this modem is equipped with a feature to self-test its circuitry by simulating an on-line situation. If the self-test fails, lighting an error LED, you know you're not ready to go on-line for real.

**PULSE OR TONE** The Encore 1200LC can dial using either pulse or tone or a combination, which makes it possible to dial through a switchboard and using special long-distance phone services. You may use the modem to dial phone numbers for voice communication, too, by picking up the handset once a connection is made and then pressing any key, which tells the modem to hang up its end of things. Auto-answer may be enabled and disabled through one of the DIP switches or selected through software commands.

Documentation for this modem is adequate: a small, photocopied manual that mentions or explains most things well enough for most people.

The Encore 1200LC is completely compatible with the Hayes protocol. In my extensive testing, there was no Hayes command this modem could not recognize, and I wouldn't mind if you swapped my Smartmodem for the 1200LC. There is no noticeable difference between the two, except that the 1200LC tolerated slightly more noise than the Smartmodem 1200 in the PC Labs tests (though neither modem's scores could be used to entice buyers). In fact, the only place you'll feel a real difference between the two modems is in your wallet.

**HALF-SIZE CARD** The Encore 1200HB is a true half-size modem card that may be installed in the short slot of an XT and configured as COM1, COM2, COM3, or COM4 through DIP switch settings on the modem. It comes with no software and offers compatibility with the

## PC MAGAZINE FACT FILE

**OmniTel Inc.**
5415 Randall Pl.; Fremont, CA 94538; (415) 490-220

*The OmniTel line of modems is reasonably priced and of good quality. The star achiever is the OmniPak, which comes with 384K of RAM, ports, and software as well.*

① **OmniTel Encore 1200HB**
**List Price:** $299
**Requires:** Half-length slot
**In Short:** This modem on a half-card performed well. A more accessible speaker adjustment would be convenient
CIRCLE **650** ON READER SERVICE CARD

② **OmniTel Encore 1200LC**
**List Price:** $299
**Requires:** Asynchronous communications adapter, RS-232 cable.
**In Short:** A Hayes Smartmodem look-alike with the same features and very similar performance but a much lower price tag.
CIRCLE **651** ON READER SERVICE CARD

③ **OmniTel OmniPak**
**List Price:** $449
**Requires:** Full-length slot.
**In Short:** A great buy: the OmniPak provides 384K bytes of RAM, ports, and *Bit Com* software for the same price you might pay for a modem alone.
CIRCLE **648** ON READER SERVICE CARD

④ **OmniTel Encore 2400HB**
**List Price:** $449
**Requires:** Half-length slot.
**In Short:** This 2,400-bps half-card exhibits very low tolerance to noise when operating at 2,400 bps, but it performs well at 1,200. The 1,200-bps performance may not be worth the $150 difference between this modem and its 1,200-bps counterpart.
CIRCLE **649** ON READER SERVICE CARD

# INTRODUCING

**RELAY Silver™** meets the very high standards that business communications require. It transfers any file, 100% error free. For a wide variety of users, with a wide variety of needs.

RELAY Silver™ is forged from the same metal as our critically acclaimed RELAY Gold®, the communications software that *PC Magazine* made Editor's Choice, saying "If you're looking to establish a corporate-wide standard for communications, look at RELAY Gold." (10/28/86)

RELAY Silver™ is the newest member of The RELAY Family.™ It can do every PC communications task Gold can. So, if you don't need support of 3270 emulation boards, protocol converters or RELAY mainframe software, RELAY Silver is the standard to choose. And RELAY Silver lists for only $150.

Here are a few more outstanding reasons to choose RELAY Silver:

- Menus and context-sensitive help screens make it easier for beginners to use.
- A powerful script language lets experienced users reduce complex file transfers to one step.
- Concurrent operation lets users run other software during transmission of long files.
- Additional Advantages:

-Learn mode to record logon sequences.
-Tutorial diskette.
-Resident and unattended modes.
-RELAY bi-directional protocol plus XMODEM and KERMIT.
-TTY, TELEX, VT100 and VT52 terminal emulation.
-Support of IBM PC and compatibles.

## PC Communications Software for Demanding Business Needs

**Visit Your Local Computer Store, or Call For Further Information**

**The RELAY Family™**

VM Personal Computing
41 Kenosia Avenue Danbury CT 06810
800-84-RELAY 203-798-3800

CIRCLE 131 ON READER SERVICE CARD

Hayes command format. The 1200HB is completely compatible with the Hayes Smartmodem 1200B, and comes with a 2-year limited warranty.

Setup and installation are not difficult procedures; they are well detailed and even illustrated in the manual, beginning with an overview of COM ports on the IBM PC. The modem comes factory-configured for COM2 port, so unless that represents a conflict to your system, you need not change it. A table lists the combination of DIP switch settings for the four possible COM port addresses.

The DIP switches on the 1200HB are conveniently located through a slot on the rear panel of the board, which allows you to change their settings after the board has been installed and the cover secured, provided you have access to the rear panel of your computer. As well as controlling the COM port address, the switches may be used to permanently enable/disable the modem's auto-answer mode, the data terminal ready signal, and the carrier detect signal. As with all OmniTel modems, a self-test feature is included to prevent the frustration of going on-line without being properly configured.

Assuming the default DIP switch settings agree with your configuration, you simply install the board in any open slot, even the short slot of an XT, and plug in the line and/or phone jacks, and then boot up. In my case, that's all there was to it. The modem worked immediately as I dialed up MCI Mail through *PC-Talk III* and Dow Jones News/Retrieval through *Microsoft Access*.

The modem board has a small speaker whose volume may be adjusted by turning a screw on the back of the board, which, of course, you cannot do with the board installed. So if you want to listen to seven volume settings before you decide on the one you want, you have to reinstall the board six additional times to listen to each one. A perfect solution would be to place the volume screw in its own little window on the rear panel of the board, as with the DIP switches.

The 1200HB works identically to the Smartmodem 1200B, using exactly the same auto-dialing protocol. It may be operated at full or half-duplex, in automatic or manual originate and answer modes, and using either tone or pulse telephone dialing. The modem may be used with any Hayes-compatible communications software or with OmniTel's *Bit Com* program, which cost s $65 extra.

## THE OMNITEL SOLUTION

As we began to analyze the line-noise resistance test data, we became concerned about the poor showing of several modems and requested additional samples to eliminate the possibility of our having tested a unit that may not have been representative of the model's usual performance.

One of the companies contacted, OmniTel, was concerned about the poor performance of one of its products, and along with replacement modems sent one of its representatives to PC Labs. OmniTel had just purchased a TAS modem test unit, so its technical staff repeated our tests in their plant.

OmniTel engineers discovered that one of the major reasons for the modem's poor performance was that on a noisy line in originate mode, the modem would begin to adjust itself to the phone line and attempt to detect the carrier tone before the other modem began to send it. When the answering modem did finally send the carrier tone, the signal confused the modem, which disconnected.

The solution was simple: instead of using ATDT 555-1212 for a dialing sequence, we used ATDT 555-1212,,,, each comma causing a several-second delay. The modem then did not look for the carrier tone before it was there and worked much better. The average improvement was 6 dB at 2,400 bits per second, meaning that the modem could handle four times the noise it could before these changes. Under conditions where it couldn't even connect before, it could now send data with only 3 to 4 percent of the characters garbled.

We then selected two other modems—the Basic Time 2400 and the AT&T 4024—and retested them with these dialing delays. The results were about what we expected: performance of the Basic Time 2400 improved about as much as did that of the OmniTel. The AT&T 4024's performance, was essentially unaffected.

If you are using an OmniTel modem (also sold by Leading Edge, Amazing Things, and PC's Limited) a Basic Time modem (also sold by Qubié), or any other low-cost modem, try adding three or four commas to the end of the number you are dialing.—**Howard Marks**

### THREE SIGNIFICANT DIFFERENCES

OmniTel's 2400HB is a modem card that may be operated at up to 2,400 bps: that is the first difference between it and the 1200HB. The second difference is $150. The third is that the Encore 2400HB has one of the worst tolerances for noise among the modems tested. Other than those three things, the 2400HB and the 1200HB are identical modems, so I will not bore you by listing the features they have in common. Following are the features unique to the 2400HB.

2,400-bps operation is by no means the only reason to buy this or any other high-speed unit. As our PC Labs performance tests show, 2,400-bps modems turn in significantly better performance at 1200 bps than do most 1200 bps modems. And of course, if you go on-line with a database service, or if you dial up other computers long distance for more than a few minutes at a time, using 2400 bps might save you money in the long run.

My testing of the Encore 2400HB at 2,400 bps did not produce spectacular results. I dialed a friend with a 2,400-bps modem over a fairly noisy house phone line, and we had all sorts of problems. The speed was great; the accuracy was not. File transfers were lost or garbled 50 percent of the time, and line noise (presumably) introduced extraneous characters into our keyboard-to-keyboard conversations. This is not what I want at 2,400 bps. The PC Labs tests confirmed the modem's very low tolerance to noise at 2,400 bps. In fact, only once did they succeed in transferring a file. And even when running the 2400HB at 1,200 bps, noise tolerance is just not

# HOW TO RUN A HARD DISK SYSTEM WITHOUT BACKUP.

Crossing your fingers is great when you're telling your mother-in-law you'd love to have her visit for a month. But, you are pressing your luck when you run your computer system without backup protection.

Crossed fingers won't help when a crash wipes out your data and you have to spend hour after hour trying to retrieve what has been lost, recreate what has been forgotten or re-enter what is gone.

But, a Cipher 5400 tape backup system can offer dependable security for that important data. Designed for today's high capacity disks systems on the IBM PC XT, AT and compatibles, the Cipher 5400 is available as a stand alone, self powered unit offering 60 megabytes of fast backup and compatibility with such networks as Novell. The 5400 is completely read/write compatible with IBM's 6157 tape backup system. And, Cipher backs it with a two-year warranty and six-month warranty exchange program.*

Best of all, the Cipher 5400 frees your fingers for more important tasks, like signing contracts and shaking hands after a successful deal.

So, why not uncross your fingers and use one to dial 1-800-843-3751, Ext. 9; or within California, 1-800-722-0670, Ext. 9, for more information about the Cipher 5400 backup system.

**CIPHER 5400 TAPE BACKUP SYSTEM.**

cipher

* If your 5400 fails to operate within the first six months of use, Cipher will replace it. IBM PC XT, AT and IBM 6157 are trademarks of IBM Corporation. Cipher is a Registered Trademark of Cipher Data Products, Inc.

CIRCLE 232 ON READER SERVICE CARD

# DO NOT ATTEMPT WITHOUT COMPUSERVE.

## Get all the facts as fast as the experts do before you try to tame the market.

Without accurate, up-to-the-minute data you can easily get taken for a ride on Wall Street. That's why it's important to get your hands on CompuServe. The fastest, most reliable source of comprehensive financial data available.

Now, just like Walf Street's most prestigious firms, you can check out a tip or find a hot, money-making lead in a matter of seconds. Investigate any area of interest. Or scan CompuServe's financial news highlights to find new areas to investigate. Including...

**Continuously updated quotes** on over 10,000 issues.

**MicroQuote II**—12 years of daily historical prices, along with dividends, splits, distributions and interest payments on more than 90,000 stocks, bonds, mutual funds, options, foreign exchange rates and hundreds of market indexes.

Graph trends quickly online. Review your portfolio performance, investigate returns in bull and bear markets. Screen for stocks to buy, or transfer prices and dividends to your microcomputer for detailed analysis.

**Standard & Poor's** descriptive information on over 3,000 companies.

**Value Line Data Base II**—extensive, fundamental data for analyzing the performances of over 1,800 major corporations.

**Disclosure II**—descriptive and financial information from the SEC filings and annual reports of over 8,500 companies.

**Institutional Broker's Estimate System** (I/B/E/S)—earnings projections from top research analysts on over 3,000 widely followed companies.

You can also research technical market trends, review economic projections and high-powered market analyses. Get expert advice on retirement, financial planning, managed accounts, taxes and insurance. Evaluate your own portfolio, even connect to a variety of at-home banking and brokerage services.

And all this comes with CompuServe's base of news, weather, telecommunications, special interest and entertainment services.

Compare CompuServe's rates to the cost of expensive floppy-based sources. Compare our up-to-the-minute delivery to time-consuming publication research. Compare the depth and breadth of our virtually infinite databases to any other source of investment information.

Then see your nearest computer dealer for a CompuServe Subscription Kit. Suggested retail price is only $39.95 and includes $25 of online time.

For more information or to order direct, call or write:

**CompuServe®**

Information Services
P.O. Box 20212
5000 Arlington Centre Blvd.
Columbus, OH 43220

**800-848-8199**
In Ohio, call 614-457-0802

An H&R Block Company

CIRCLE 226 ON READER SERVICE CARD

good enough to make a prospective buyer out of me.

I guess the long and the short of it is this: I tried to find a good reason or a feature to make me want to go out and buy this modem, but I failed. There are several much wiser ways to part with $450, such as with the OmniPak.

**MULTIFUNCTION BOARD MODEM** The OmniPak is a single-slot multifunction board featuring a 300/1,200-bps Hayes-compatible modem, 384K bytes of RAM, asynchronous serial communication port, parallel printer port, battery-backed clock/calendar, and game port for $450. Also included in that price are cables mounted on a bracket with parallel and game ports, an RJ-11 phone cable, a card edge guide, RAMdisk and printer spooler software, and the *Bit Com* communications program. It's a very attractive package to say the least, although the modem's tolerance for noise isn't great.

The obvious reason to go with a multifunction board such as this one is to expand RAM and add a modem without eating up two slots. You can take the rest of the features as gravy. You may select the memory-starting address to accommodate other memory expansion you may have. The RAM is parity checked unless you disable that feature with a jumper pin.

**INSTALLATION** As you might expect, installation of this board isn't as easy as it is with a straight modem board. But it shouldn't be too difficult if you follow the accompanying documentation, which is generally well written. Before you begin to install this board, you must make sure that your system board's DIP switches and the OmniPak's DIP switches and jumpers are properly set. The switches you will likely have to set will control the memory and configure the serial port for COM1 or COM2, the parallel port for LPT1 or LPT2, and the modem as COM1, COM2, COM3, or COM4.

With DIP switches and jumpers checked, you insert the board into any open full-length slot, plug in the line and/or phone jacks and your serial and parallel ports if you are using them, install the extension cables from the board to the bracket containing parallel and game ports, which may also use any open slot, and off you go. A self-test feature allows you to check the configuration of your system with the modem before actually going online.

The modem fully supports the Hayes command protocol, so you may use Hayes-compatible software with it. Or you may use the included *Bit Com* program (it is not supplied with the other OmniTel modems, though all of them can use it).

**BIT COM PROGRAM** *Bit Com* is an attractive menu-driven communications package with plenty of features to handle most tasks. The main menu lists four choices: Select/Edit Phone Numbers, Invoke Script File, Change Configuration, and Issue DOS Command, selected with the corresponding number keys. At the bottom of the screen are two prompts, F1 for Help and F2 to Exit.

The first submenu allows you to position your cursor next to a list of ID numbers, descriptions, and phone numbers and answer, dial, or connect with your choice. The function keys bring up further screens for adding or deleting phone records in addition to sorting the list by ID number, description, or phone number. It's a handy phone-list manager. The second submenu allows you to use these phone numbers within automated "scripts," which can dial up and log on to services and computers without your help.

The third submenu lets you change the configuration of your modem's many parameters such as dial prefix and suffix, answer and hangup string, communications and printer port, and so forth. The fourth submenu allows you to suspend everything while you issue DOS commands that operate outside of the communications software.

As well as maintaining script files, you can maintain and use action files that allow automation after a connection has been made with a remote source. This is useful if you do several things in the same order every time you log on. This program can do it all for you while you sit back and enjoy your morning cup of coffee. As an addition to a multifunction board, this program is terrific. And at only $65 extra with the other modems, it's a bargain.

**—Phil Wiswell**

## PC's Limited

Want to buy an excellent 2,400-bit-per-second internal modem at a bargain price? Look no further than the PC's Limited PC 2400 B from that upstart mail-order company, PC's Limited.

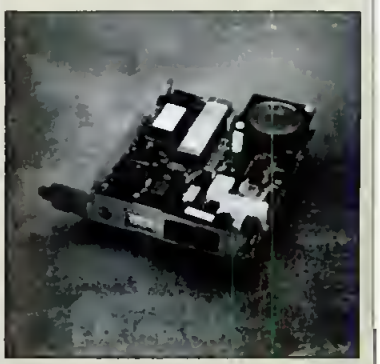
PC's Limited is best known for manufacturing computers that run faster than IBM's and selling them at a fraction of the price.

The company was founded in 1984, did about $6 million in sales during its first year, and will probably rake in $60 million this year. It's owned lock, stock, and barrel by its founder, a 22-year-old college dropout named Michael Dell. Its products carry a 2-year warranty and a 30-day money-back guarantee.

The modem reviewed here was added to its line because customers buying com-

PC MAGAZINE FACT FILE

**PC's Limited**
1611 Headway Circle, Bldg. 3
Austin, TX 78754
(800) 426-5150
(800) 252-8336 (in Tex.)



*PC's Limited does it again, combining great performance with a low price.*

**PC's Limited PC 2400 B**
**List Price:** $289
**Requires:** Any Hayes-compatible computer or terminal.
**In Short:** An excellent choice for the budget-minded. It has no built-in error correction but plenty of other features.

CIRCLE **631** ON READER SERVICE CARD

puters were asking for modems too. It's Hayes compatible, made for them by OmniTel, and sells for a modest $289, about $150 less than the same modem with an OmniTel label on it. Admittedly, PC's Limited doesn't include software in this price (OmniTel throws in *Bit Com* if you buy the modem from them), but the unit is still a bargain.

The circuitry on the PC 2400 B is highly integrated and fits into a single, firmly packed half-size add-in card. Less-integrated modems are bulkier, consisting instead of two piggybacked boards.

The circuitry on the PC's Limited PC 2400 B is highly integrated and fits into a single, firmly packed half-size add-in card.

As you slide the modem into a slot, you'll note that the screws on the speaker stick out far enough to leave only 1/16 inch clearance between them and an adjacent board in the PC's bus. This is not a problem, however, since the screws are nylon and can't short an adjacent board.

**EXTERNAL SWITCH SETTING** The modem's switches are accessible from outside the computer, allowing you to change carrier detect and data terminal ready settings without tearing your machine apart. This is especially convenient if you use several communications programs that require different switch settings.

But that's not all. By external switching you can also set which COM port the modem will use. And the PC 2400 B will support assignment of the COM port to COM3 or COM4, unlike many modems that support only COM1 and COM2. There's an excellent discussion of this subject in the manual, which states that some computers don't support COM3 or COM4 but that Zenith and Columbia PCs do and advises users who have other brands to check with the manufacturer.

Of course, anyone planning to use this modem with COM3 or COM4 serial ports must have software that will support those assignments, too. *Bit Com*, *Telpac*, and *HyperAccess* are among the communications packages that do.

For those whose computers and software can support COM3 and COM4, the modem solves another potential problem. Most modems that can be set to COM3 or COM4 use interrupt levels IRQ3 or IRQ2. Sometimes this doesn't work, since COM1 and COM2 also use IRQ3 and IRQ2. This PC's Limited modem can be set to IRQ2 or IRQ5 as well, to eliminate such conflicts. Of course, you can use these settings only if your communications package also supports them.

There is no mechanical setting for speaker volume. This means that if you don't like the default volume setting, you'll have to issue a software command each time you use the modem to change the volume.

There is also no mechanical switch that sets whether or not the modem will answer calls—a drawback that seems tolerable for such an economical modem. You can issue software commands to set it to answer. Its default setting is not to answer.

**ATTACK DIALER** The modem produces the extended responses, among which is a busy message that it can display on your screen. This feature is helpful only to people with communications programs that can recognize the busy message and redial immediately in response to it. Surprisingly few programs do this. Many can issue dialing commands for you, and some can redial if they don't connect within a given length of time, but only a handful actually detect the busy message and redial immediately. Therefore you must have both software and a modem that can recognize the busy signal. Otherwise, you'll have to wait 30 to 60 seconds with your speaker blaring out a busy signal before your software realizes it did not achieve a connection and redials. This PC's Limited modem in combination with the right software can be a real attack dialer.

People with Centrex or PBX systems, who have to dial one number, wait for a dial tone, and then dial out, will appreciate that the modem has a special dialing command for this very purpose: DDT *phone number*.

In PC Labs line-noise resistance tests, the modem performed very well at 1,200 bps and moderately well at 2,400 bps.

The OmniTel manual that comes with the modem is neither fancy nor very long, but basically it contains the information that the average computer user will need. It explains commands well, but could use some examples for better comprehension. The order in which subjects are presented is not always perfectly logical, and there's no table summarizing the functions of the various switches, nor any index. But overall, it's still a good job.

Taking the price and features into consideration, the PC 2400 B is a winner.

**—Marvin Bryan**

## Penril DataComm

Penril DataComm has been manufacturing modems since 1968. The company also makes other communications gear, such as multiplexers and CSU/DSU (channel service units/data service units). In the past, Penril has concentrated its marketing efforts on the Fortune 500 but is now also selling through the retail channel. Its strong points as a modem manufacturer include its trained service team and the variety of service plans it offers for its products.

Three Penril modems were tested for this review: the Cadet 1200, the Cadet 2400, and the Datalink 2400. These are all external modems that require the user to have an asynchronous communications adapter installed with a standard serial cable to connect the modem to the adapter.

The two Cadets are almost identical in their outward appearance. They are the same size (10 by 6½ by 1½ inches) and weight (2 pounds). The only discernible differences between the two are the nameplates on the front, the three-color LED on the 2400 that tells you whether you're operating at 300, 1,200 or 2,400 bits per second, and the power connectors on the back. Both these modems are powered by

transformers that plug into the wall socket, as is the Datalink. The 1200 is connected to the transformer by a contact like those used to connect small headsets to Walkman-like radios—the more-or-less standard wall-mounted transformer connection.

In the Cadet 2400 and the Datalink 2400, the connection is made with a cylindrical five-contact connector. The only difference in setting up the two Cadet modems is in these connectors. In fact, instruction manuals for the the Cadet 1200 and the 2400 have a section entitled "Quick Start" that instructs the user simply to plug in the modem, plug in the RS-232 cable, plug in the telephone line (supplied with both modems), and go. That's all there is to it, unless there is something "different" involved in the installation.

**CHECK SWITCH SETTINGS** In fact, operating the 2,400-bps Cadet 2400 is about as simple. Just connect the modem to the telephone line, to the terminal or PC, and to the power and begin to use the modem. Modems have become, after all, commodity consumer items, in many cases easier to operate than stereos or VCRs. But there are instances where the Cadet 1200 and 2400 can give some pause. There are two switches that must be set properly, for instance. One of them is preset at the factory for operation with a switched, or dial-up, line. Most applications will probably be on such lines, since leased lines, the other alternative, are mostly used in large corporations with big telecommunications budgets.

In all probability the factory default setting won't have to be changed, which is a good thing, as the switch is inside the modem case. I checked to see that it was set the way the manual said it was, a procedure that required opening the modem case. This is an easy matter of removing four screws and then separating the two halves of the case from one another, exposing the single printed-circuit board inside. Indeed, the switches in both modems were set for switched-line operation.

The second switch is located at the rear of the modem in both cases and is, therefore, easily accessible from the outside. The manual's instructions for setting this switch are somewhat vague, yet on the bottom of the modem is a simple chart that says very concisely and clearly how the switches on the back of the modem are to be set. Apparently, in this case, a chart is worth several hundred words.

When setup is completed, you're ready to operate your modem. If you have communications software that is configured to work with a Hayes-compatible modem, then you'll have no problem with these devices, because both responded to the Hayes command set of my *Crosstalk XVI* software.

Specifically, I told *Crosstalk* to dial numbers for bulletin boards to which I subscribe, and the modems did it without requiring modification to the software that I was using, which was set for a Hayes-compatible modem. *Crosstalk* also hung up the phone, as expected, in command mode. Then I switched to another software package, *Telpac*, which lets you enter terminal mode, without being connected, to test manual sending of commands to the modems. All worked fine, which means that these Cadet modems are probably about as compatible with Hayes modems as any. This is important, since it means

## PC MAGAZINE FACT FILE

**Penril DataComm**
207 Perry Pkwy.; Gaithersburg, MD 20877-2197; (301) 921-8600

*Penril DataComm's external modems are all solid products, but the Datalink 2400 has the best collection of features and is the most powerful.*

① **Penril Cadet 1200**
**List Price:** $289
**Requires:** RS-232 port, serial cable, communications software.
**In Short:** A low-priced 1,200-bps modem. Its setup is accomplished through rear-panel switches, or through Hayes-compatible commands. The modem's performance was not consistent in the environment tested.
CIRCLE 640 ON READER SERVICE CARD

② **Penril Cadet 2400**
**List Price:** $535
**Requires:** RS-232 port, serial cable, communications software.
**In Short:** A Hayes-compatible 2,400-bps modem that takes up little desk space and is easy to set up through rear-panel switches. It had some difficulty communicating with CompuServe at 2,400 bps, although none at 1,200 or 300 bps.
CIRCLE 639 ON READER SERVICE CARD

③ **Penril Datalink 2400**
**List Price:** $595
**Requires:** RS-232 port, serial cable, communications software.
**In Short:** A large 300/1,200/2,400-bps modem with impressive capabilities. Hayes compatible or Penril compatible, it also provides MNP reliable-link service. An LCD on the front panel serves to set up the modem and to keep the user informed of the status of the call. Compared with the Cadet 2400, this one is worth the extra $60.
CIRCLE 638 ON READER SERVICE CARD

I Always TAKETWO.

"...just put up your feet, take a 2-minute break, and let TakeTwo do the rest."

PC MAGAZINE
August, 1986
"EDITOR'S CHOICE"

TAKETWO™ is the automatic hard disk backup program which completely manages the entire backup process, and takes less than 2 minutes a day. No wonder it is the PC Magazine's Editor's Choice as well as the corporate-wide choice of leaders like GE and Ralston Purina. Take the Best. TAKETWO.

Visit your local software dealer or call

1-800-892-0007
(In Virginia, 703-556-0007)
United Software Security, Inc.
8133 Leesburg Pike, Suite 800, Vienna, VA 22180

™ TakeTwo is a trademark of United Software Security, Inc

CIRCLE 308 ON READER SERVICE CARD

## ■ MODEMS

that selecting software to couple with them is just a matter of finding software that is Hayes compatible—a simple task.

Operation of these modems is straightforward, but in both cases, the operation is spotty. For example, sometimes the Cadet 1200 was able to dial in tone mode, and at other times it would not break the dial tone on the line. It would dial, but after the dialing sequence, I would still hear the dial tone, and there was no ring at the other end of the line. Apparently there was no connection to the telephone line. Pulse dialing worked fine. The Cadet 2400 would sometimes be able to connect at 2,400 bps, and at other times it would not. PC Labs tests indicate that the Cadet 1200 was unable to communicate properly over noisy lines, while the 2400 had little trouble at either 1,200 or 2,400 bps, but neither modem performed well on my phone lines. Of course, it is a problem that I have very noisy telephone lines, since there are times when even voice communications become difficult.

**DEPENDABLE DATALINK** Nevertheless, I have not had a problem with my usual modem, which is a 1,200-bps Hayes-compatible unit. On the other hand, the Datalink 2400 modem gave me no problem at all. It is clear that this modem is a more serious piece of equipment than the Cadet modems. For one thing it is larger, measuring 2½ by 9½ by 10 inches, which is about twice as large as the Cadet modems. It's heavier as well, although not much, since it too is powered by a supplied wall transformer with a five-pin cylindrical connector. Like the Cadet modems, the Datalink 2400 modem has two telephone jacks in the back—one for the line and one for the telephone—which are marked so that one will not connect the lines incorrectly (although I managed to do it wrong once). There are three internal switches on the main board inside this modem.

Also inside are three printed-circuit boards—the main board (containing the Rockwell International 2,400-bps chip set that makes this a 2,400-bps V.22bis-compatible modem), a second board mounted over that (containing the switches and is apparently used for setting the modem parameters), and a display board. This last board supports the LCD by which the user sets his modem parameters. There are no instructions for setting the internal switches—they are set at the factory. The modem has nonvolatile memory for keeping parameters set, and push buttons and the display for programming.

The user's manual includes a straightforward walk-through of the menu-driven setup procedure. The factory-set default parameters are well explained, as are the parameter options. Setting up is about a 5-minute chore, and then you're ready to communicate, assuming you plugged in the supplied phone cord and the serial cable from your computer or terminal.

Again, the modem is Hayes compatible. It actually has two modes—the Penril command set, used in other Penril products, and the Hayes-compatible mode, which is the default set at the factory. Left in default mode, the modem passed all Hayes compatibility tests with flying colors. It dialed and operated at 2,400, 1,200, and 300 bps with aplomb. The front panel display keeps the user advised of what's happening, taking the place of the activity indicator lights found on most external modems.

One interesting feature of this modem is its ability to operate either asynchronously or synchronously. Another is the capability of providing a reliable link through MNP (a protocol available from Microcom, which is used by a number of modem manufacturers, some on-line bulletin boards like CompuServe, and some public access data networks like Tymnet). MNP checks for and corrects errors in data transmission.

The Datalink 2400 offers one other winning feature: it can store 20 telephone numbers for dialing in its nonvolatile memory.

**SUBSTANTIAL EQUIPMENT** Overall, the Datalink is a more substantial piece of equipment than the Cadet modems, and its operation proved to be more trouble-free. Its cost is not significantly greater than that of the Cadet 2400. And for that the user gets the capability to use the MNP protocol, a significant bonus. However, the Cadet modems will perform adequately for most applications and will take up less space than the DataLink 2400.

**—David Gabel**

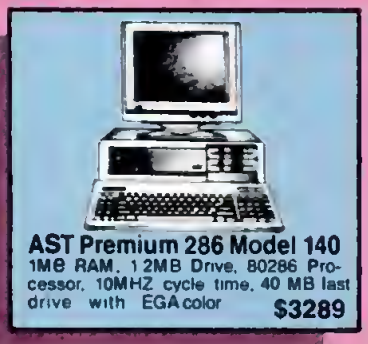
THE OLDEST COMPUTER DEALER IN THE SOUTH
—COMPLETE SYSTEMS SHIPPED OVERNIGHT!—

# 1-800-241-0286

OVER 3 MILLION DOLLARS IN INVENTORY AND THOUSANDS OF DIFFERENT PRODUCTS IN STOCK. CALL FOR OUR FREE CATALOG.

PC MART
Personal Computer Centers
1485 Northeast Expressway, N.E.
Atlanta, GA 30329

INFORMATION
1-404-634-5995



**AST Premium 286 Model 140**
1MB RAM, 1.2MB Drive, 80286 Processor, 10MHZ cycle time, 40 MB fast drive with EGA color **$3289**

## SYSTEMS

- **IBM PC/AT**—80286 Processor, 30MB Voice Coil Drive, 1.2MB Drive, 512K Monographics Monitor.....**$3695**
- **AST PREMIUM 286 MODEL 80**—1.2MB Drive, 512K **$1649**
- **IBM PC/XT**—360K Floppy, 20MB Hard Disk, 640K **$1575**
- **AT&T 6300**—(2) 360K Floppies, 640K, Mono Monitor DOS.....**$1599**
- **TURBO XT**—360K Floppy, 20MB Half-Height, Ser/Par/Clk **$995**
- **TOSHIBA 3100 LAPTOP**—360K Floppy, 10MB Hard Disk w/Plasma Screen .....**$3295**

**CALL FOR OUR UNADVERTISED SYSTEM SPECIALS!!!**

## MONITORS

- **MITSUBISHI DIAMOND-SCAN**—High Resolution EGA....NEW!! .....**CALL**
- **NEC MULTISYNC EGA**.....**$595**
- **MITSUBISHI 1409** Color Monitor .....**$359**
- **PGS HX-12 & HX-12E** Color Monitors .....**CALL**
- **PGS MAX-12E MONITOR** (770 x 350 Res w/Enhanced Capability) .....**$169**
- **AMDEK 410A** (720 x 350 Resolution) w/Flat Screen—NEW!! .....**CALL**
- **SAMSUNG TRUE MONOCHROME** (720 x 350 Resolution) .....**$89**

**MITSUBISHI 1410**
640 x 350 Resolution EGA Monitor
**$459**

**BROTHER M-1709**
230 cps 9 Pin Dot Matrix with Tractor Feed with Parallel Cable **$539** Delivered

## PRINTERS/PLOTTERS

- **AST / QUADRAM LASER PRINTER**.....**CALL**
- **QMS LITTLE KISS LASER PRINTER** (24 downloadable fonts).....**$1879**
- **BROTHER TWINWRITER** (Daisy Wheel & 9 Pin Dot Matrix).....**$895**
- **EPSON FX–286e & FX–86e**..... **NEW LOW PRICE**
- **BROTHER 1409** (9 Pin Dot Matrix Narrow Carriage).....**$359**
- **TOSHIBA 321/341/351 MODEL 2** (24 Pin Printhead).....**CALL**
- **HEWLET PACKARD 7550A** (8 Pen/31.5 IPS/10" x 16" Plot).....**$3199**
- **HOUSTON INSTRUMENTS DMP42** (1 Pen/3 IPS/20" x 32" Plot).....**$2995**

## SOFTWARE

| | |
|---|---|
| ASHTON TATE dBase III Plus | $369 |
| BORLAND LIGHTNING | $69 |
| BORLAND PROLOG Artificial Intelligence) | $69 |
| BORLAND SIDEKICK (Non Copy Protected) | CALL |
| BORLAND REFLEX | $69 |
| MULTIMATE ADVANTAGE | $295 |
| MICROSOFT WORD | $289 |
| WORDPERFECT (New Version!) w/ Spellchecker | $239 |
| MECA MANAGING YOUR MONEY (w/'87 Tax information | $119 |
| MICROSTUFF CROSSTALK XVI | $99 |
| SUBLOGIC JET SIMULATOR | $35 |
| HARVARD PERSONAL PUBLISHER | $499 |
| SOFTWARE PUBLISHING Professional Series | FROM $149 |

## BOARDS

| | |
|---|---|
| • HAYES 1200B w/o Software | $325 |
| • HAYES COMPATIBLE INTERNAL 1200 Baud with Comm SW | $139 |
| • QUADRAM EGA PROSYNC CARD | $349 |
| • HERCULES COLOR CARD | $159 |
| • HERCULES GRAPHICS PLUS | $199 |
| • HERCULES Compatible Monographics Card w/Parellel | $139 |
| • INTEL Above Board/AT w/126K Expandable to 1.5 MB W P/S | $369 |
| • AST SIXPAK PREMIUM w/256K Expandable to 2 MB S/P/C | $199 |
| • FAC I/O CARD SERIAL/ Parallel/Cook/Game Port | $109 |
| • INTEL INBOARD 386 AT Turn Your AT into a 386 | NEW! |
| • QUAD 366— High Power for Your XT | NEW! |

## DRIVES

| | |
|---|---|
| • 20MB HALF HEIGHT | $395 |
| • 30 MB VOICE COIL FAST ACCESS | $695 |
| • SEAGATE 40MB High Speed Half-Height | CALL |
| • PRIAM 40MB AT (29 Millisecond Access Time) | $995 |
| • PRIAM 60MB AT (19 Millisecond Access Time) | $1295 |
| • FILECARD 30MB Hard Card | NEW |
| • TANDON 21MB Business Card | $479 |
| • PLUS DEVELOPMENT 20MB Hard Card (Thin) | CALL |
| • INTERNAL TAPE DRIVES from 10 to 40MB | FROM $259 |

**CALL FOR OUR COMPLETE CATALOG**

CIRCLE 496 ON READER SERVICE CARD

PC MART Personal Computer Centers™

COMPAQ
AT&T AUTHORIZED DEALER
Compaq products available in retail stores only

VISIT OUR SHOWROOMS IN ATLANTA, CHARLOTTE, DURHAM, & RALEIGH

## Benchmark Tests: 1,200-bps Modems Tested at 1,200 bps

(Signal-to-noise ratio measured in decibels)
(Longer bars indicate modems that are more noise resistant)

The results of the PC Labs line-noise-resistance benchmark tests show all modems are not created equal. In the tests of the 1,200-bit-per-second modems, for example, the difference between the best and the worst performers in originate mode at average line conditions is 15 decibels, a significant difference in the modems' ability to break through the noise barrier and transmit files without error.

As might be expected, the Hayes Smartmodems, both internal and external versions, fell in about the middle of the pack.

While most of the other modems produced results slightly above or below the Hayes scores, there were notable exceptions. The most significant is the unparalleled Prentice PopCom C150, which proved almost five times more resistant to noise than the Hayes products.

The most important finding generated by the tests of 2,400-bps modems was their sterling performance at 1,200 bps. Overall, their resistance to noise was much higher than that of 1,200-bps models. However, when the modems are run at 2,400 bps, their resistance to noise drops dramatically.

The test results suggest that the best buy in modems right now is an inexpensive 2,400-bps modem. It will give you much better performance than a 1,200-bps model, and you'll be ready to take advantage of higher speeds when their use becomes more common.

It's important to remember that even though a modem was not able to transmit without error, it doesn't necessarily mean the modem won't work at all.

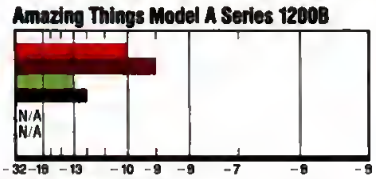
**The PC Labs modem tests** use the TAS Voiceband Channel Simulator and modem tester to measure a modem's immunity to various noise levels and line conditions. The modem tester sends 100 blocks of data each consisting of 100 bytes and measures the number of transmission errors. If any errors are detected, the level of noise is reduced and the data sent again. This process is repeated until the 100 blocks can be sent without error.

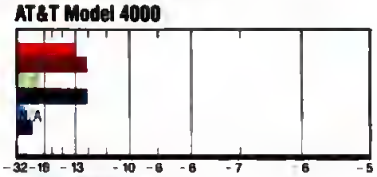
In all the tests data is sent between the modem under test and a Hayes Smartmodem 2400 in both originate and answer mode for each speed the modem supports (1,200 and 2,400 bits per second).

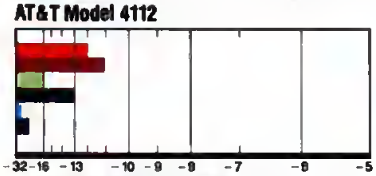
The tests are repeated on three sets of line conditions—C4, C2, and 3002—which represent predivestiture Bell System standards for leased (private) lines. The C4 line is relatively clear. The C2 has some audible noise but not enough to make the connection unusable. The 3002 line approximates the worst conditions you will normally find on a dial-up line. Each line has higher levels of phase jitter, amplitude jitter, and other line defects than the previous line. The noise introduced for the test is "white noise," which is the hiss normally heard in the background.

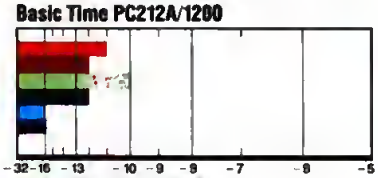
Transmission results are given as the signal-to-noise ratio, measured in decibels, which represents the signal level needed to achieve error-free transmission. Each 3 decibels represents a doubling of the ratio, so at −12 decibels the noise is twice as strong relative to signal as at −15 decibels and four times as strong as at −18 decibels. A modem that is error-free at −6 decibels, for example, is much more noise-resistant than one that is error-free at −12 decibels.

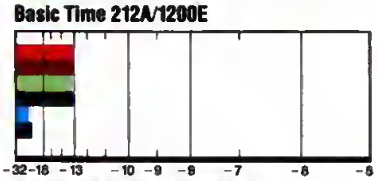
N/A—not applicable: modem could not perform the PC Labs test without transmission errors
Note: Though reviewed, the Natural Microsystems Watson, Prentice PopCom X150, and Visionary 1200 modems could not be tested using the PC Labs equipment.

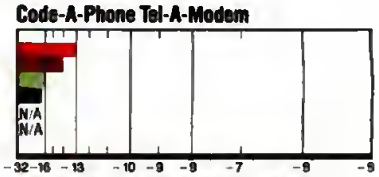


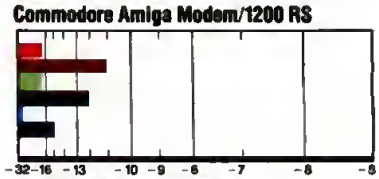



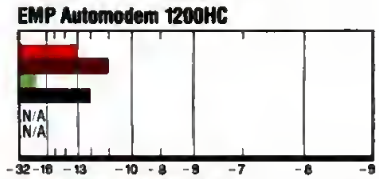



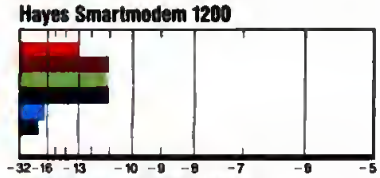



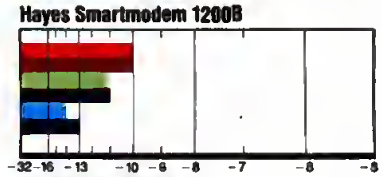



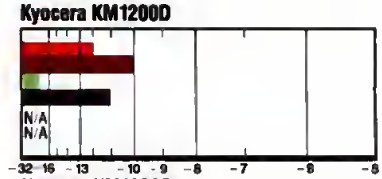


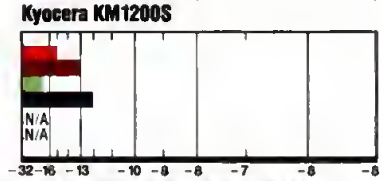



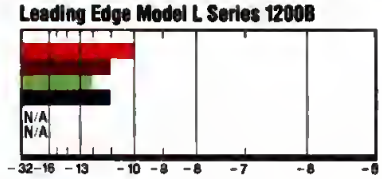



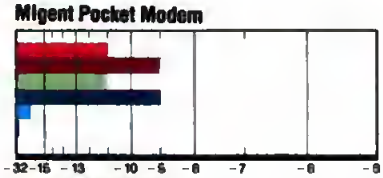



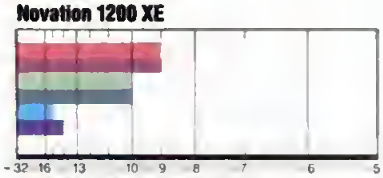



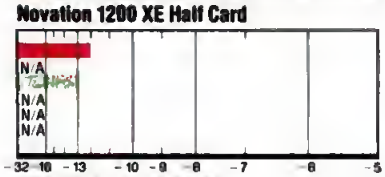
Migent Pocket Modem



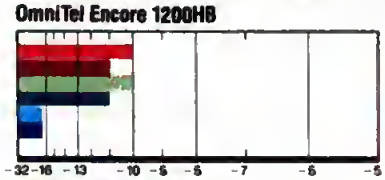

Novation 1200 XE



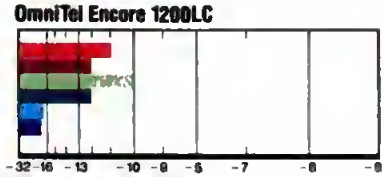

Novation 1200 XE Half Card



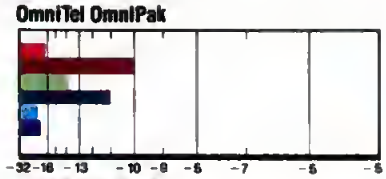

OmniTel Encore 1200HB



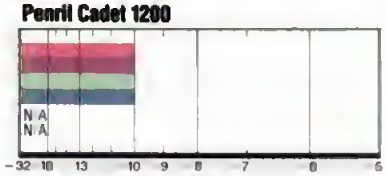

OmniTel Encore 1200LC



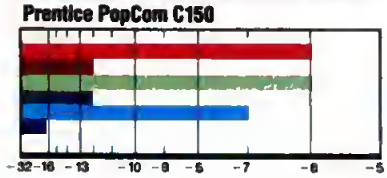

OmniTel OmniPak



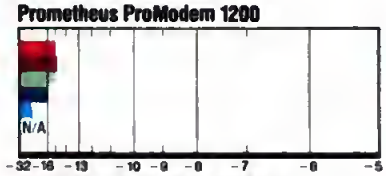

Penril Cadet 1200



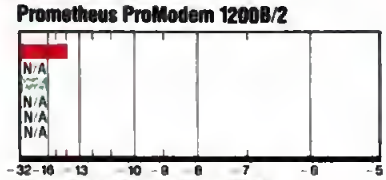

Prentice PopCom C150



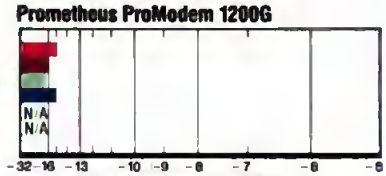

Prometheus ProModem 1200



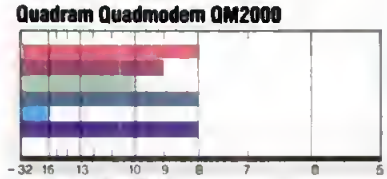

Prometheus ProModem 1200B/2



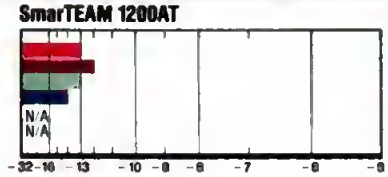

Prometheus ProModem 1200G



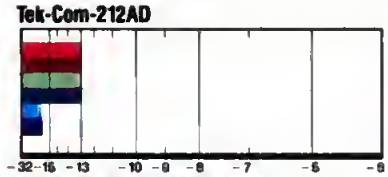

Quadram Quadmodem QM2000



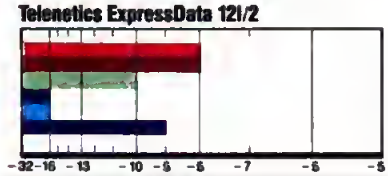

SmarTEAM 1200AT



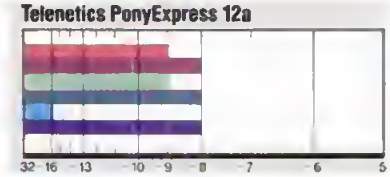

Tek-Com-212AD



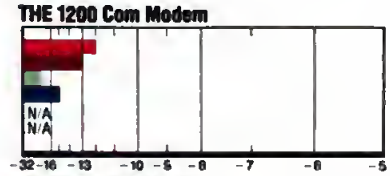

Telenetics ExpressData 12i/2



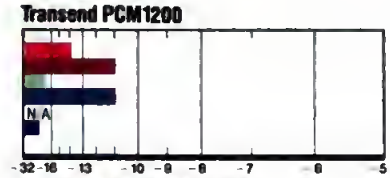

Telenetics PonyExpress 12a



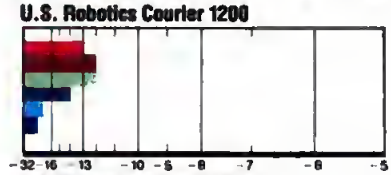

THE 1200 Com Modem



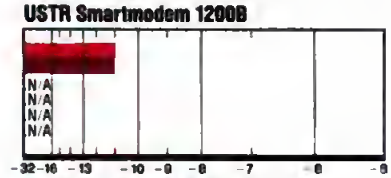

Transend PCM1200



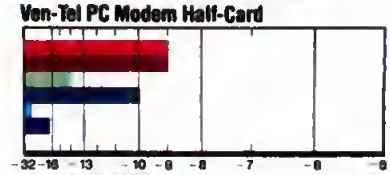

U.S. Robotics Courier 1200



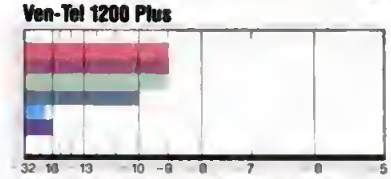

USTR Smartmodem 1200B



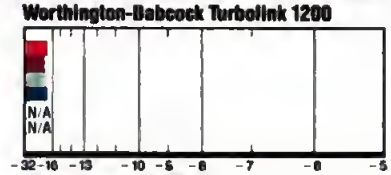

Ven-Tel PC Modem Half-Card



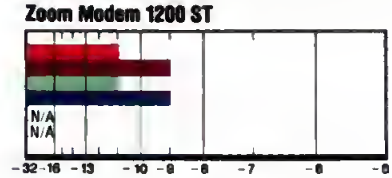

Ven-Tel 1200 Plus




Worthington-Babcock Turbolink 1200




Zoom Modem 1200 ST

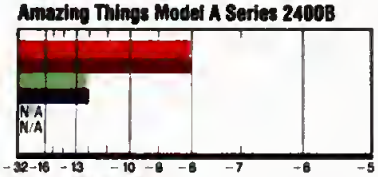


## Benchmark Tests: 2,400-bps Modems Tested at 1,200 bps

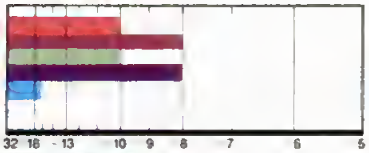
(Signal-to-noise ratio measured in decibels)
(Longer bars indicate modems that are more noise resistant)

N/A—not applicable: modem could not perform the PC Labs test without transmission errors.
Note: Though reviewed, the Basic Time 2400E and Bytcom 24/12 ADH modems could not be tested using the PC Labs equipment.

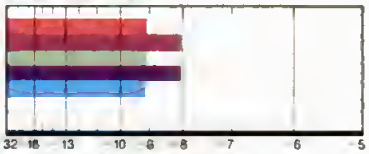
### Amazing Things Model A Series 2400B



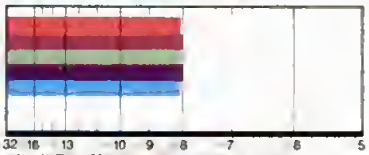

### AT&T Model 4024



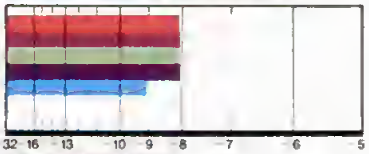

### Basic Time 2400I



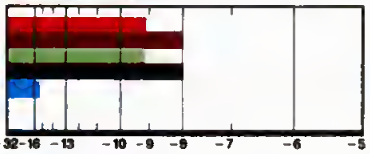

### Black Box Dial Modem 24 Plus



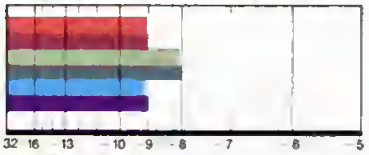

### Black Box Half-Card Modem 2400



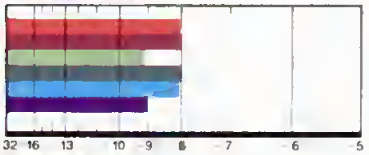

### Cermetek 2400SPC



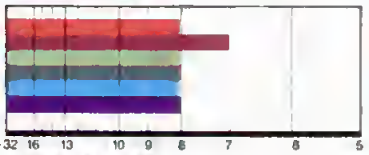

### Dowty Quattro V.22bi International Modem



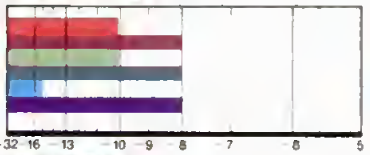

### Fastcomm 2496T



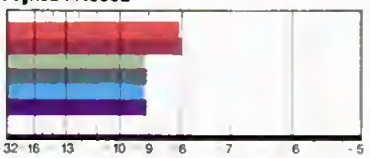

### Fastcomm 2496T-B



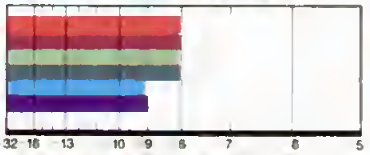

### Franklin FM-2400E



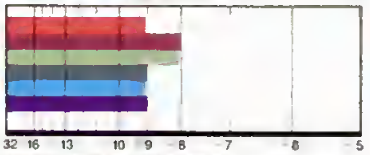

### Fujitsu M1935D



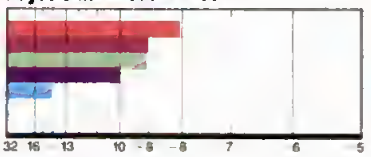

### Gandalf Data Access Series SAM 24S



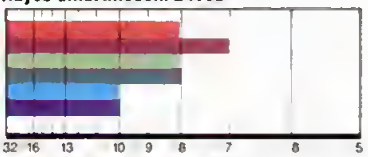

### General DataComm Acculine 224



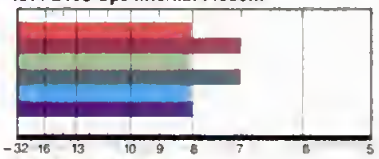

### Hayes Smartmodem 2400



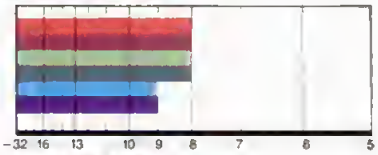

### Hayes Smartmodem 2400B



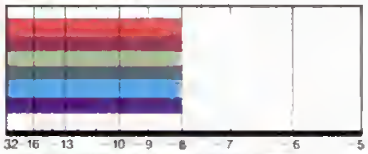

### IBM 2400-bps Internal Modem



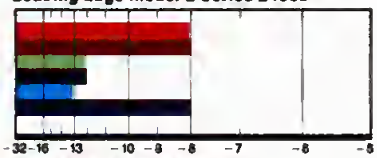

### IBM 5842 Modem



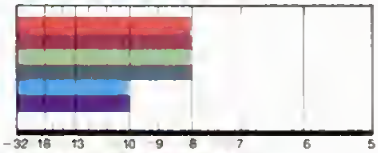

### IDEAcomm 2400



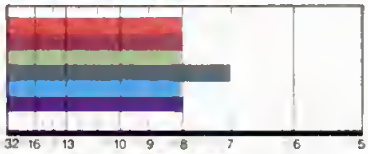

### Leading Edge Model L Series 2400B



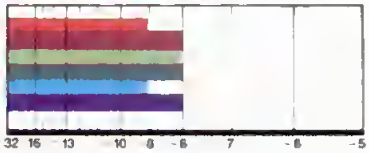

### Multi-Tech MultiModem224E



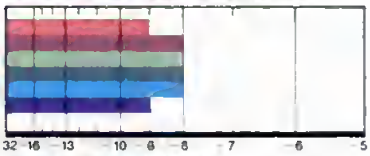

### Multi-Tech MultiModem224EC



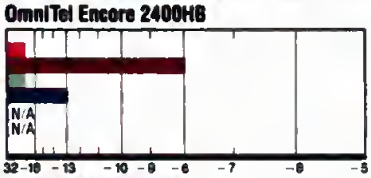

### Novation 2400 Professional



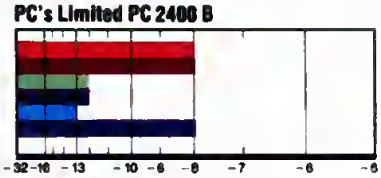
**Novation 2400 Professional Half Card**



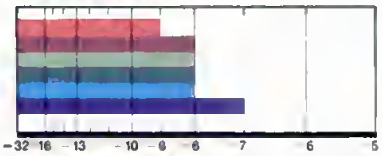

**OmniTel Encore 2400HB**



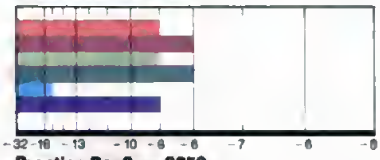

**PC's Limited PC 2400 B**



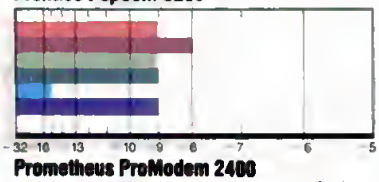

**Penril Cadet 2400**



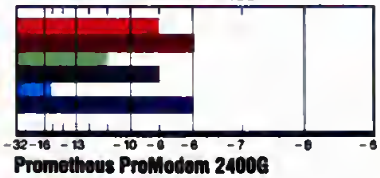

**Penril Datalink 2400**



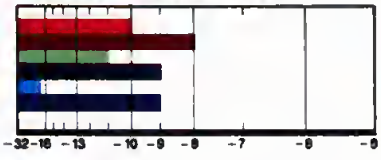

**Prentice PopCom C250**



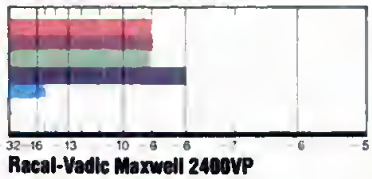

**Prometheus ProModem 2400**



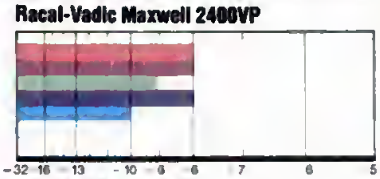

**Prometheus ProModem 2400G**



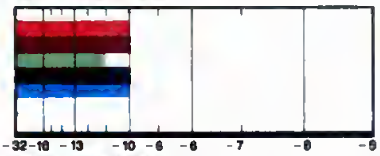

**Quadram Quadmodem QM2024**



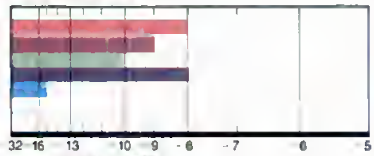

**Racal-Vadic Maxwell 2400VP**



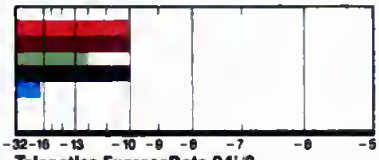

**Racal-Vadic 2400PA**



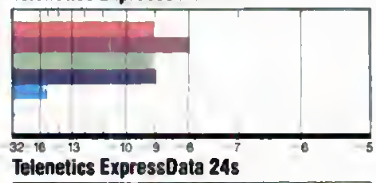

**SmarTEAM 2400**




**SmarTEAM 2400B**



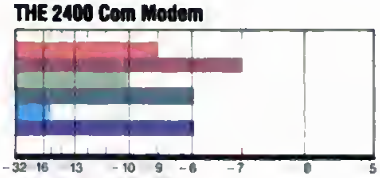

**Telenetics ExpressData 24i/2**



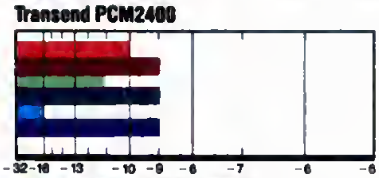

**Telenetics ExpressData 24s**

**Telenetics PonyExpress 24a**

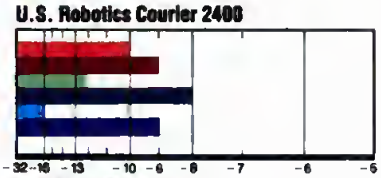
**THE 2400 Com Modem**



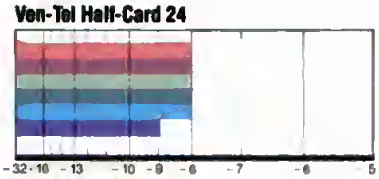

**Transend PCM2400**



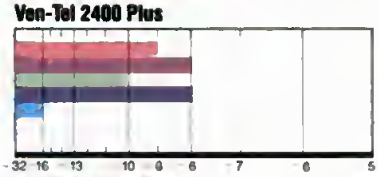

**U.S. Robotics Courier 2400**



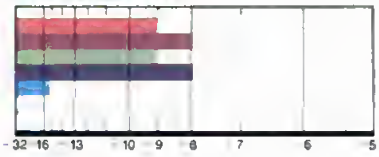

**Ven-Tel Half-Card 24**




**Ven-Tel 2400 Plus**




**Zoom Modem 2400 ST**

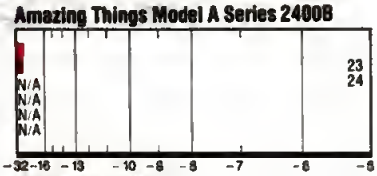


## Benchmark Tests: 2,400-bps Modems Tested at 2,400 bps

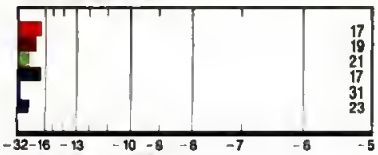
(Signal-to-noise ratio measured in decibels)
(Longer bars indicate modems that are more noise resistant)

N/A—not applicable: modem could not perform the PC Labs test without transmission errors.
Note: Though reviewed, the Basic Time 2400E, Bytcom 24/12 ADH, and Black Box Half-Card Modem 2400 modems could not be tested using the PC Labs equipment.

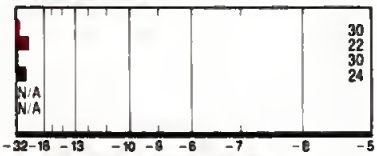
### Amazing Things Model A Series 2400B



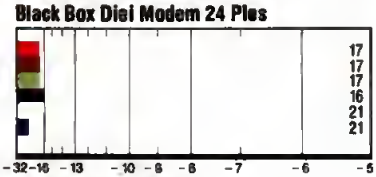

### AT&T Model 4024



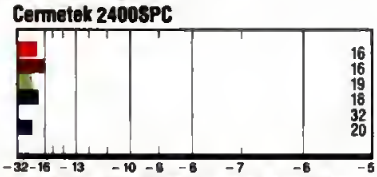

### Basic Time 2400I



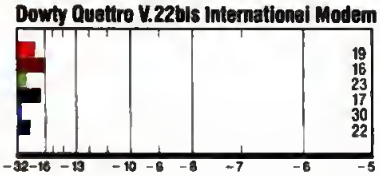

### Black Box Dial Modem 24 Plus



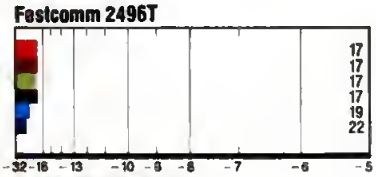

### Cermetek 2400SPC



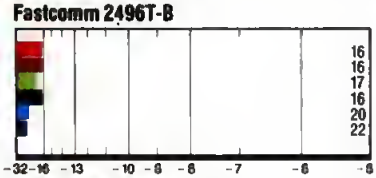

### Dowty Quattro V.22bis International Modem



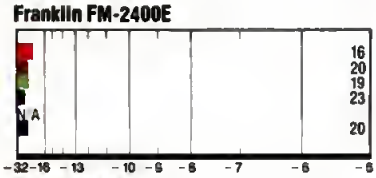

### Fastcomm 2496T



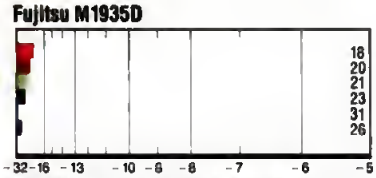

### Fastcomm 2496T-B



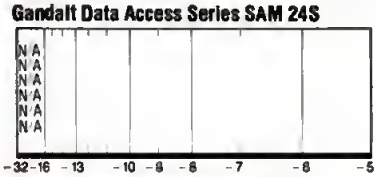

### Franklin FM-2400E



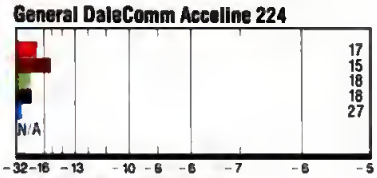

### Fujitsu M1935D



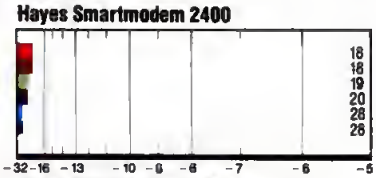

### Gandalf Data Access Series SAM 24S



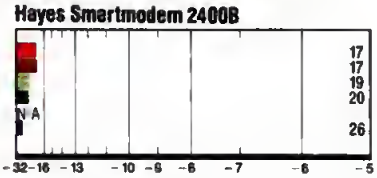

### General DataComm Accoline 224



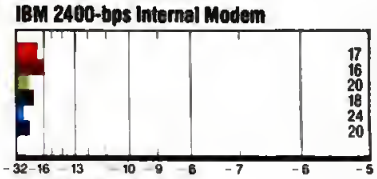

### Hayes Smartmodem 2400



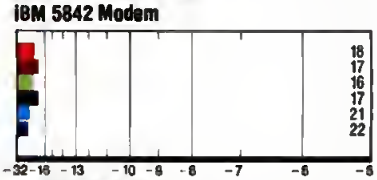

### Hayes Smartmodem 2400B



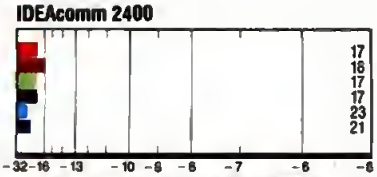

### IBM 2400-bps Internal Modem



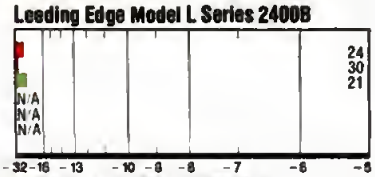

### IBM 5842 Modem



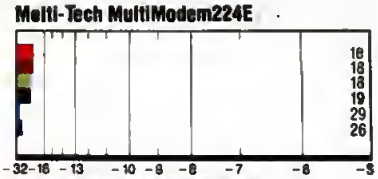

### IDEAcomm 2400



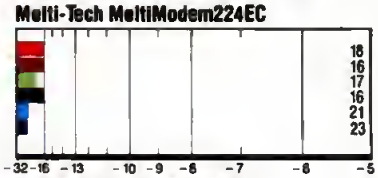

### Leading Edge Model L Series 2400B



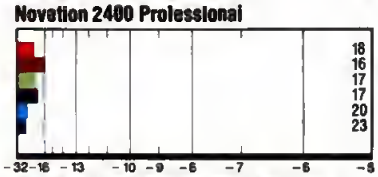

### Multi-Tech MultiModem224E



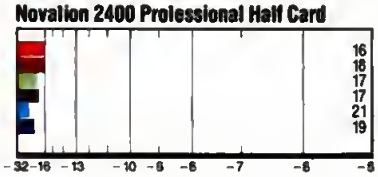

### Multi-Tech MultiModem224EC



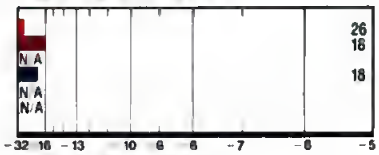

### Novation 2400 Professional



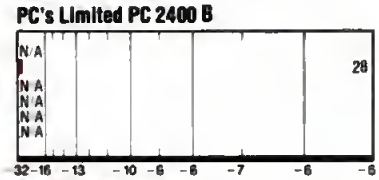

### Novation 2400 Professional Half Card



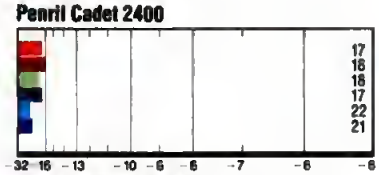
**OmniTel Encore 2400HB**



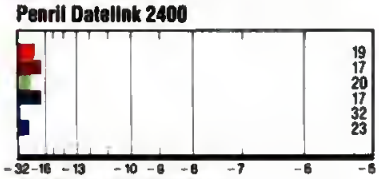

**PC's Limited PC 2400 B**



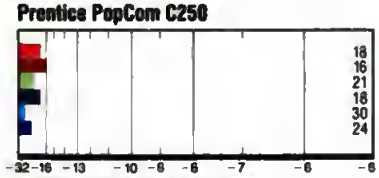

**Penril Cadet 2400**



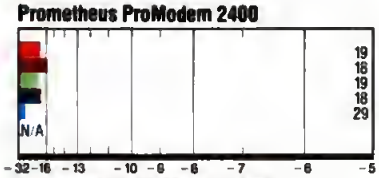

**Penril Datelink 2400**



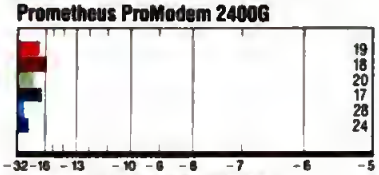

**Prentice PopCom C250**



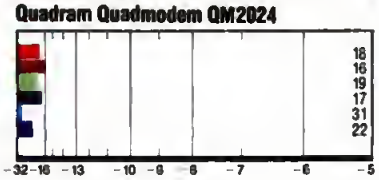

**Prometheus ProModem 2400**



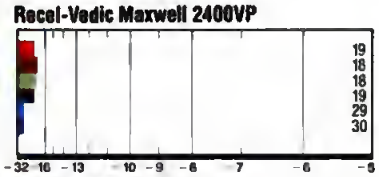

**Prometheus ProModem 2400G**



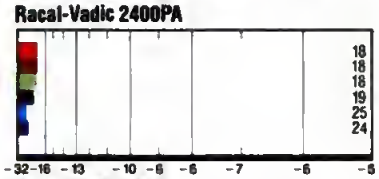

**Quadram Quadmodem QM2024**



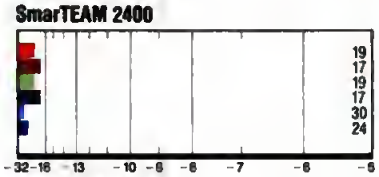

**Recel-Vadic Maxwell 2400VP**



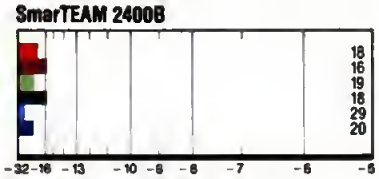

**Racal-Vadic 2400PA**




**SmarTEAM 2400**

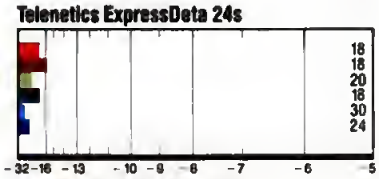



**SmarTEAM 2400B**

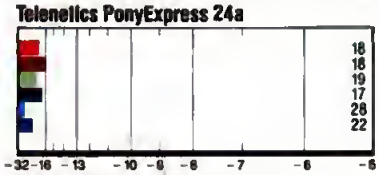



**Telenetics ExpressData 24i/2**

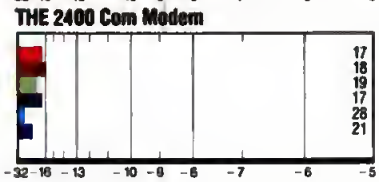
**Telenetics ExpressData 24s**



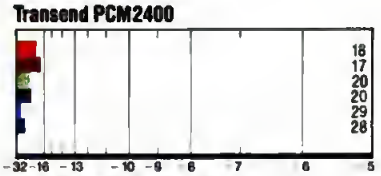

**Telenetics PonyExpress 24a**



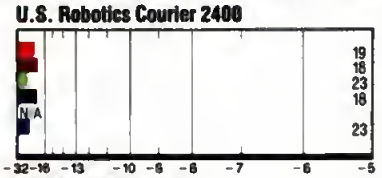

**THE 2400 Com Modem**



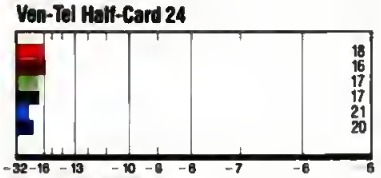

**Transend PCM2400**



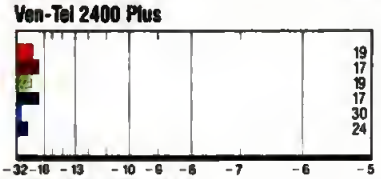

**U.S. Robotics Courier 2400**



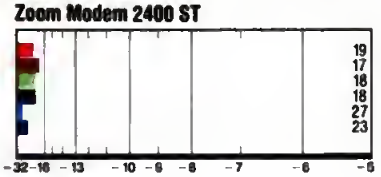

**Ven-Tel Half-Card 24**




**Ven-Tel 2400 Plus**




**Zoom Modem 2400 ST**



# The improvements

**The original 8-MHz COMPAQ DESKPRO 286.® Best in its class.**

## Introducing the new 12-MHz COMPAQ DESKPRO 286.® 50% faster, 100% Compaq.

You've never seen this much performance in an 80286-based desktop. Numerous enhancements to its proven technology are one more example of how Compaq maintains its industry leadership by improving and innovating.

Compaq raised the standard from 6- to 8-MHz processing speeds. Now we're setting the pace again with 12 MHz, so you can run industry-standard software up to 50% faster.

And so you won't lose compatibility, we pioneered dual-speed processing, which reduces speed from 12 to 8 MHz in the few cases it's needed.

Compaq also maintains hardware compatibility with 8-MHz expansion slots that let you use industry-standard expansion boards, modems and add-ons without sacrificing your 12-MHz speed.

### Hidden assets

While many manufacturers cripple high-speed processors with low-speed RAM, Compaq gives you up to 2.1 Megabytes of 12-MHz RAM on the system board without using an expansion slot, 8.1 Megabytes using only three.

Speed is also boosted by high-performance 20-, 40- or 70-Megabyte fixed disk drives with some of

# are out of sight

## The new 12-MHz COMPAQ DESKPRO 286. Now the best is better.

the industry's fastest access times. And to protect data, we offer an internal 40-Megabyte fixed disk drive backup system, another innovation.

### Uncompromising vision

The COMPAQ DESKPRO 286 gives you better display options than any other PC in its class.

The COMPAQ Dual-Mode Monitor displays both high-resolution text *and* graphics. And the COMPAQ Color Monitor and COMPAQ Enhanced Color Graphics Board support EGA and CGA standards, displaying 16 colors at once from a palette of 64.

You get more expandability too—with seven available full-height expansion slots and room for four *internal* half-height storage devices, including 1.2-Megabyte or 360-Kbyte diskette drives.

### See for yourself

Our improvements may be hidden, but they're clearly apparent in superior performance. That's why the most demanding users prefer Compaq. And why we can offer a full-year limited warranty.

Seeing is believing. For the location of your nearest Authorized COMPAQ Computer Dealer, or for a free brochure, call 1-800-231-0900, operator 20. In Canada, 416-449-8741, operator 20.

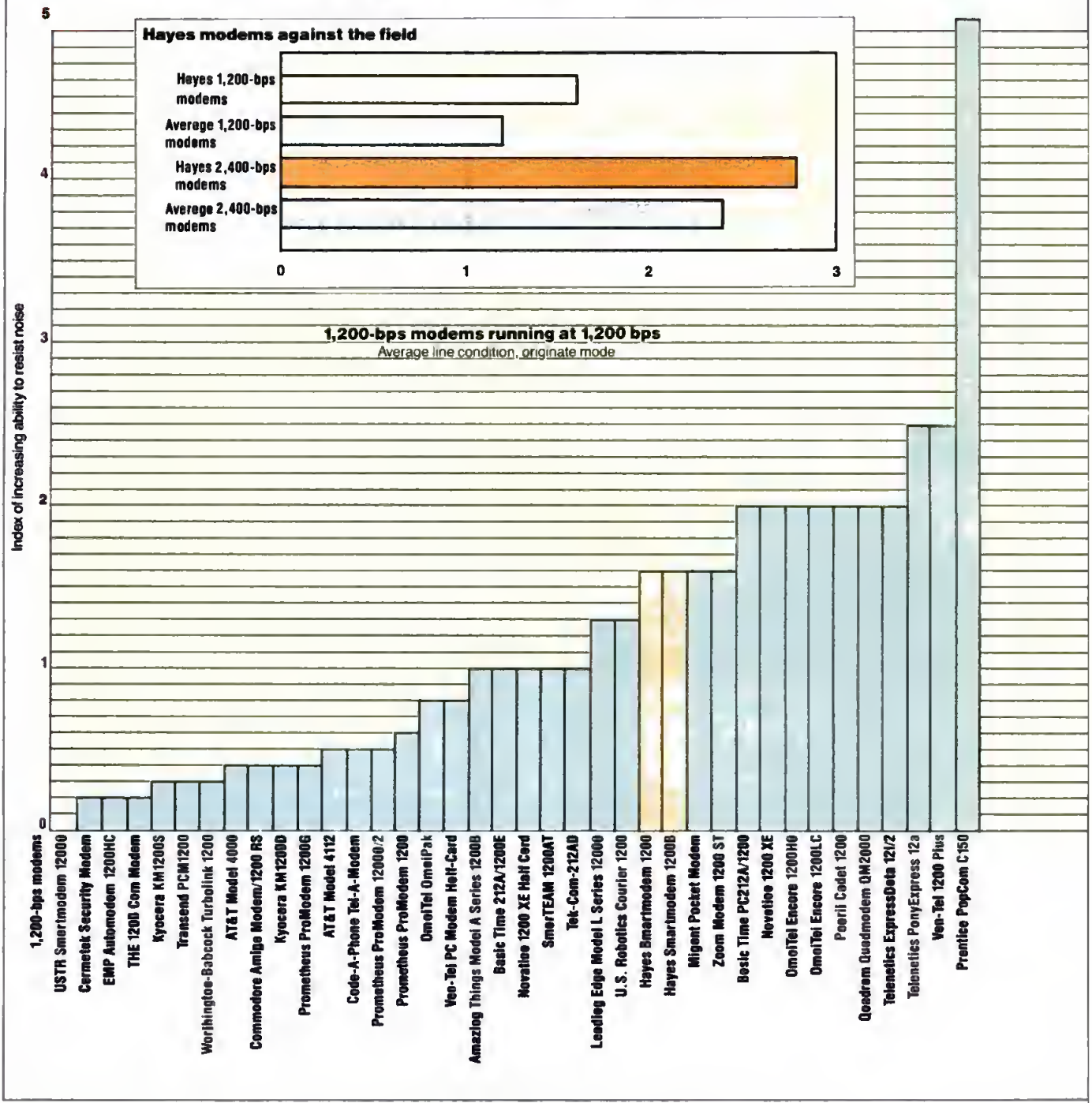
*©1987 Compaq Computer Corporation, all rights reserved.*

COMPAQ®

It simply works better

## Modem Performance Index: Cutting Through the Static

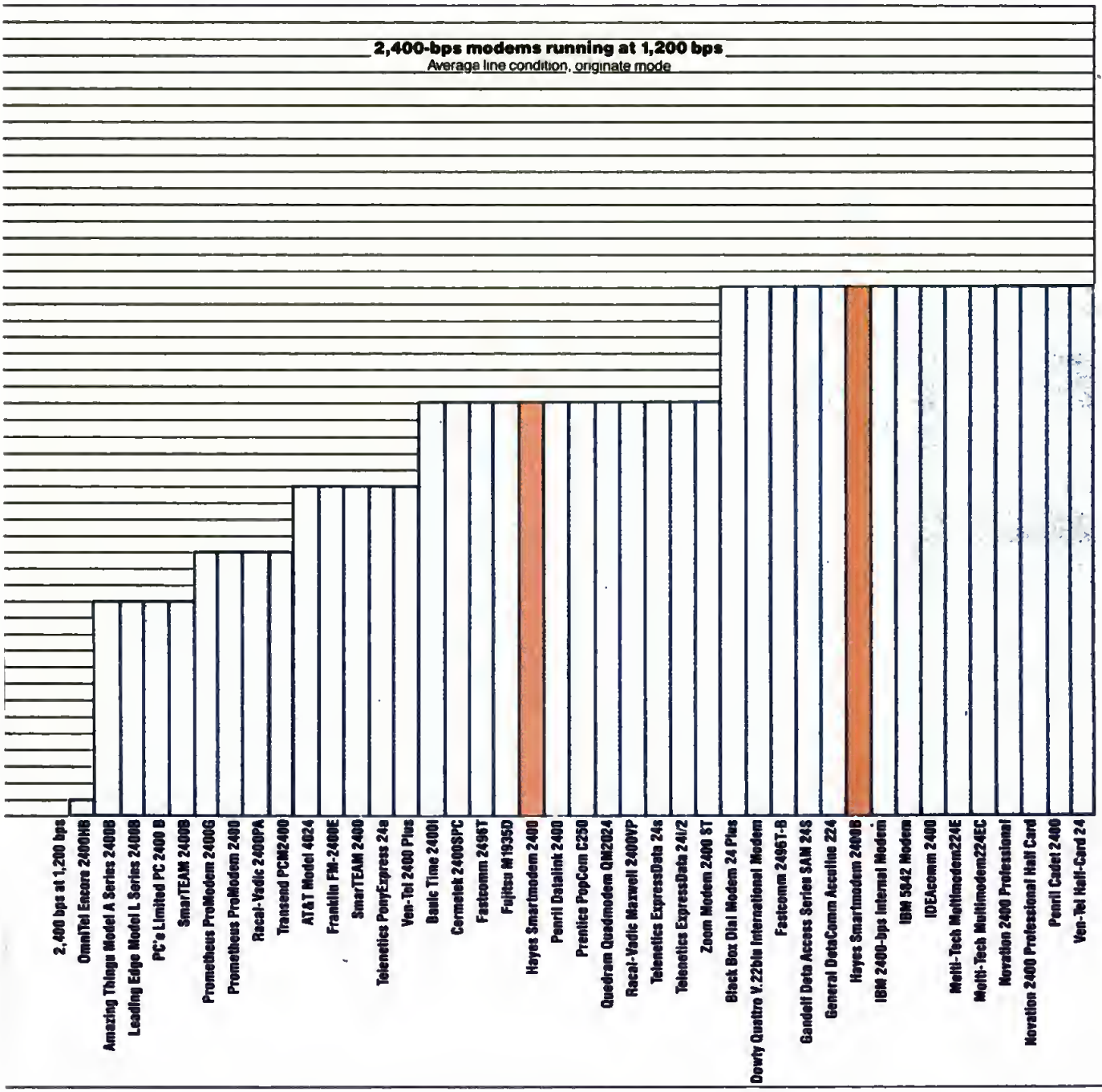
To isolate the test that matters most, you need to look at results that most accurately reflect real-world conditions. For the majority of modem users those conditions mean operating your modem in originate mode at 1,200 bits per second over lines of average quality. Since poorer modems (shorter bars on the chart below) have lower resistance to line noise, your best bang for the buck might be a low-cost 2,400-bps modem running at 1,200 bps.



This chart compares the ability of the modems tested to punch through error-free data over increasingly noisy phone lines. Unlike audio equipment, where high signal-to-noise ratios indicate better quality, good modems are marked by low signal-to-noise ratios. This means that they can distinguish a signal not much stronger than the background noise. The data here, derived from the PC Labs TAS Voiceband Simulator and modem tester results, started as decibels and was inverted and normalized so that a higher index indicates better performance.

For quick comparison, 1,200-bps modems are grouped on the left in increasing order of performance, 2,400-bps modems (running at 1,200 bps) on the right. In addition, inset are the averages for Hayes 1,200- and 2,400-bps modems, plus the average for all 1,200- and 2,400-bps modems tested.

Note the generally higher performance of the 2,400-bps modems, but don't use this chart alone. Modems also should be compared on price, features (especially compatibility with the Hayes command standards), and performance on better- and worse-than-average line conditions.



## Prentice Corp.

PopCom stands for Popular Communications, and putting communications in the hands of the populace is what has made Prentice Corp. a $10 million corporation. A manufacturer of power supplies since 1966, Prentice moved into modems when government deregulation kicked off the independent telephone industry.

Prentice currently manufactures a full line of modems that includes products operating at nearly every speed from zero to 9,600 bits per second, as well as line drivers and multiplexers. Its PopCom products—including the C100, C150, X100, X150, C200, and C250—are aimed primarily at the personal computer industry.

Prentice model numbers are assigned under a readily decipherable scheme: the Cs are internal, Xs external; the 100 series operates at a top speed of 1,200 bps, the 200 series at 2,400 bps. The -00 suffix indicates a bare modem, and the -50 suffix indicates that the modem box is packed with *PFS:Access* communications software. Thus the C100 is an internal, 1,200-bps modem that's electrically equivalent to the C150, and the same description applies to both.

At the bottom of the line, the PopCom C100/150 design is obviously dated—a first-generation internal PC modem. The sparsely populated, full-length, XT-height expansion board is primarily based on discrete circuitry and two Prentice custom chips.

The American-made board reflects what must be a trial-and-error approach to circuit layout: four long, skinny green wires snake through its componentry—so-called engineering change orders that say someone goofed and that the board didn't work as originally planned. On the whole, workmanship is ho-hum—nothing you'd nominate for display at the Museum of Modern Art.

At the retaining bracket end of the card are the requisite modular telephone connectors, one 8-pin and one 6-pin, labeled "wall" and "phone" respectively, stamped in the steel. Just below them is a grooved shaft identified as "vol.," which controls a small 1-inch speaker at the other end of the board.

The 8-pin wall jack and an RJ-35 adapter (available from Prentice but requiring installation by a telephone expert) allows the use of the C100/150 modem with multiline keysets. This jack is also compatible with standard modular telephone cables. The same jack arrangement is also used by the PopCom X100/150 and, in modified form, the C200/250.

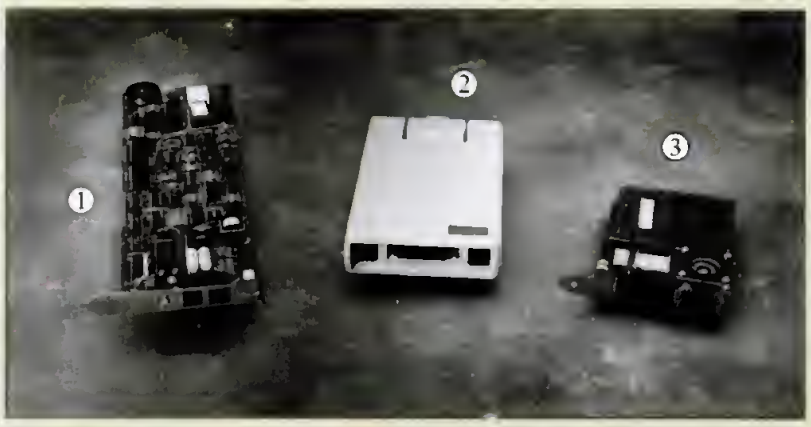
Just inside the retaining bracket at the top of the card is a three-bank DIP switch that assigns the C100/150 as either COM1 or COM2, enables or disables the control of indicator lamps in telephone key (multiline) systems, and sets the C100/150 in either a Hayes-like smart mode or a dumb-terminal mode (in which several of its RS-232 signals—specifically DSR, CTS, and CD—are always forced true).

Perhaps the reason that the design of the C100/150 has not been updated is that it performs just fine the way it is. In PC Labs testing, this modem had the best score of all the units tested. It showed significantly better resistance to line noise than any other modem.

If you class the C100/150 as aged but excellent, its electrical twin, the X100/150, would probably rate as a refreshingly original design of doubtful practicality. The whole of the X100/150 electronics are cased in a compact, beige

### PC MAGAZINE FACT FILE

**Prentice Corp.**
266 Caspian Dr.; P. O. Box 3544; Sunnyvale, CA 94088; (408) 734-9855




*The Prentice PopCom C150 is an Editor's Choice winner for its outstanding performance in PC Labs line-noise- resistance tests. The PopCom X150 mounts in a wall outlet.*

EDITOR'S CHOICE

① **Prentice PopCom C150**
**List Price:** $445
**Requires:** DOS 2.0 or later.
**In Short:** A moderately Hayes-compatible 300/1,200-bps internal modem that takes a full-length, XT-style expansion slot and includes *PFS:Access* communications software.
CIRCLE **635** ON READER SERVICE CARD

② **Prentice PopCom X150**
**List Price:** $499
**Requires:** Serial port, DOS 2.0 or later.
**In Short:** A moderately Hayes-compatible 300/1,200-bps external modem in a unique package that mounts directly in a wall outlet and includes the program *PFS:Access*.
CIRCLE **636** ON READER SERVICE CARD

③ **Prentice PopCom C250**
**List Price:** $599
**Requires:** DOS 2.0 or later.
**In Short:** A moderately Hayes-compatible 300/1,200/2,400-bps internal modem on a short card that fits any slot and operates as COM1 through COM4 with its included software package, *PFS:Access*.
CIRCLE **634** ON READER SERVICE CARD

# Datavue 20 Meg

WEST COAST COMPUTER FAIRE SHOW SPECIAL!

## Computer Tyme Slashes Prices On Datavue Portable Computers!

### The popular IBM-compatible is on sale!

***The savings have never been bigger! Computer Tyme is slashing prices on the popular IBM-compatible, portable Datavue computer. Save 40%, 60%, and more on these models:***

Datavue with 20M internal hard drive, one 3½" disk drive, 768K RAM, amber gaslit display, serial, parallel, RGB, and color composite ports ..... Was $3495 **Now just $1995**

Datavue with two 3½" drives, 768K RAM, amber gaslit display, serial, parallel, RGB, and composite ports ..... Was $2345 **Now just $1199**

With fluorescent backlit display ..... Was $1995 **Now just $899**

Datavue with 5¼" floppy drive, 768K RAM, LCD Display, serial, parallel, RGB, composite ports ..... Was $1995 **Now just $699**

With fluorescent backlit display ..... Was $1995 **Now just $899**

With amber gaslit display ..... Was $2245 **Now just $1199**

***Come by Booth # 1542 and Save!***

DATAVUE™
An Intelligent Systems Company

CIRCLE 284 ON READER SERVICE CARD

plastic shell equipped with a pair of rotating pincerlike protuberances with the clearly recognizable purpose of extracting electricity from the wall. Instead of resting underneath your telephone, the X100/150 slides into any standard wall outlet and hangs like an acrobat by its teeth. Although the stylish design deserves a salute, it also has its problems. It provides no means other than the friction of the power prongs in the outlet for holding the modem in place. If you work in an older building in which the wiring and outlets have seen better days and hold plugs loosely, the X100/150 might have a precarious perch indeed, particularly in that it will face the stress of holding a serial cable and one or two telephone wires in place.

**SIMILAR CIRCUITRY** We have no line-noise test results for this modem, since it includes a feature that shuts down the modem if no data is received within about a minute. Since the line-noise simulator takes a minute or two to adjust the line and prepare to send data, the PopCom hung up before the tester got going. This shouldn't be a problem in real life, however, because this kind of delay doesn't occur in normal transmission. Moreover, it's safe to assume that the external model will turn in the same excellent performance as the internal version, since the circuitry is essentially the same as that used in the internal C100/150 and is just rearranged to fit the different shape of its confines. Most of the discrete components are located on a motherboard that nearly fills the bottom of the case. A 2- by 3-inch daughtercard holds the custom Prentice circuits.

The rotating part of the X100/150 that has the pincers jutting out is the power transformer itself, linked to the rest of the modem by a thin flexible cable hidden inside its pivot. At the opposite end of the X100/150 are its three essential connectors with appropriate captions molded into the plastic shell: computer (a female DB-25 connector for the link to your PC), a modular 8-pin wall jack, and a modular 6-pin phone jack.

A dimple in what normally might be the bottom of the X100/150 is filled with the ribbed plastic shaft of the volume control for the tiny internal speaker. No grille is provided for the speaker, so its squeaks and buzzes must leak out the ventilation slots in the sides of the shell.

Because of the circuit similarity, the C100/150 and X100/150 function similarly in service. Both operate at 0 to 300 or 1,200 bps following the Bell 103 or 212A standards where appropriate.

Besides the hardware configuration switches on the internal model, both PopCom 1,200-bps modems are configured with software using an extended set of S registers. This configuration is volatile, maintained only as long as the modem is powered up.

The PopCom C150 from Prentice showed significantly better resistance to line noise than any other modem.

Both PopCom modems feature basic Hayes compatibility but are not totally compatible with the Hayes Smartmodem 1200 commands. Some commands are not supported, like amateur radio applications, data echoing, the special off-hook command H2, and S registers 9, 11, 13, 14, and 15. Other commands are treated differently, and Prentice adds a few commands of its own. If you want them to, the PopCom modems will also extend the extended Hayes response set to include messages indicating tone, remote ringing, or voice on the phone line.

The inherent Hayes compatibility of the 1,200-bps PopCom modems is sufficient to allow them to auto-dial, auto-answer, and auto-redial (with the repeat command) with nearly any communications program. In addition, the PopCom products allow automatic switching between voice and data communications: lift up the telephone handset, and the PopCom modem immediately gives the line back to you. No more annoying accidental hang-ups or deafening blasts of the modem carrier in your ear.

Heading this list of PopCom products, the high-speed C200/250 looks like a quantum leap ahead of the company's other PC modems. An XT-height, 5-inch short expansion card, it bears little family resemblance to its slower siblings. That's understandable, because the C200/250 was apparently adopted and has entirely different parents from the other PopCom products.

Made in Japan by Telenetics, the C200/250 is based on the Rockwell 2,400-bps chip set and delivers middle-range performance at high speed. At 1,200 bps, it climbs higher in the rankings, in league with the best. It also operates at 0 to 300 bps and is compatible with the 103, 212A, and V.22 bis communications standards.

**FACE-TO-FACE CARDS** The C200/250 is a circuit board sandwich. Two cards are mated face-to-face so all components meet in the middle. Nothing sticks up to interfere with other expansion cards in adjacent slots, even when the C200/250 is installed in an XT, with its tight, .8-inch slot spacing. A very slender loudspeaker peers out through a hole in one of the boards. The rear panel/retaining bracket of the C200/250 is decorated with a speaker volume control and two identical RJ-11 (modular 6-pin) connectors. Although both jacks are unlabeled, the upper one functions as the C200/250's wall jack and the bottom as the phone jack.

Several jumpers at the bottom of the C200/250 set it to function as either COM1, COM2, COM3, or COM4. Of course, only the first two of these configurations are accessible by DOS and most communications software; taking advantage of the latter two settings will require special programs, such as *PFS:Access*. Address assignments of the nonstandard ports are not given in the documentation.

As with the DIP switches on the C100/150, other jumpers on the C200/250 let you choose between a smart modem or dumb-terminal configuration, as well as whether the C200/250 should control the lamps in a key system.

In addition, one other jumper allows for installation of the C200/250 in XT slot 8 (the one nearest the power supply), which has a slightly different bus assignment than

# Electric Pencil PC™

*Simply the Best Value in Wordprocessing Today*

With as many features as wordprocessors selling for 10 times the price, Electric Pencil PC was designed to be sophisticated enough for the professional user yet simple enough for the beginner. Our "Quick Start Guide" will have you writing, editing, and printing in less than 20 minutes. Once you have the basics, any of 500 functions are available with a simple key-stroke. The on-screen help and extensive tutorial windows are like having a manual on disk.

There may be only two methods left for writing: a no. 2 pencil or the power of Electric Pencil PC. You'll be impressed with this full-featured wordprocessing system at a revolutionary price . . . we guarantee it!

• Supports DOS 2.0 (or higher) directory structure • On screen underlining & bold with monochrome (colors on color monitor) • Set screen, text, underlined, bold & marker colors • All prompts in English (no codes or numbers) • Recover last delete from cut and paste buffer • Built in disk file recovery • Definable function keys • All 'wordprocessing keys' are used • Designed especially for the IBM PC & compatibles • Definable screen width • Embedded printer control commands • Automatic character translation • Repeat function • Chain disk files when printing • Append files in memory • Include files from disk within text • Verify option with load & exit • Centering • Conditional paging and page numbering • Remark command in text • Print any part of text or range of pages • Over 80 individual on line help windows • DOS or expanded keyboard buffer • Toggle between main/alternate text files • optional ASCII file save/load • Parallel & serial drivers (RS-232) • "Pause" command in text • Single word spell check • Customize dictionary • Auto-learn & correct misspellings • Build "specific" dictionaries • Auto hyphenation, user defined • Dvorak, French, German & Spanish keyboard drivers • Automatic file backup • Runs on floppy or hard disk • Keyboard macros • Automatic key entry files • Simple 1 or 2 key command structure • Multiple search & replace functions • User timed auto-file save • 270 page 2 color manual • Split screens (up to 6) • Right justification • • 3½ in. disk available •

- ☑ PRINT PREVIEW TO SCREEN
- ☑ FULLY MENU DRIVEN
- ☑ 100,000 WORD DICTIONARY
- ☑ EXTENSIVE ON SCREEN TUTORIAL WINDOWS
- ☑ NOT COPY PROTECTED
- ☑ WORKS WITH ANY PRINTER
- ☑ MULTI-LINE HEADERS & FOOTERS
- ☑ RE-DEFINE ENTIRE KEYBOARD

WINNER OF THE GOLD MEDAL & PROGRAM OF THE YEAR AWARD, CREATIVE COMPUTING MAGAZINE

**MONEY BACK GUARANTEE**

Electric Pencil PC is unconditionally guaranteed for 30 days (less shipping) There is a $10.00 restocking fee if the disk envelope seal is broken.

For Texas Orders or Additional Information Call (214) 234-8466
Mail in your order today or, for immediate shipment,

CALL TOLL FREE

## 1-800-445-9004

## $69.95

*Please Add $5.00 for Shipping and Handling

25,000 Word Medical Dictionary Optional $19.95

COD's welcome. Please add an additional $3.00 COD fee. On all foreign orders, shipping cost is assumed by the buyer

DEALER INQUIRIES WELCOME

MasterCard VISA

CIRCLE 318 ON READER SERVICE CARD

**ELECTRIC SOFTWARE CORPORATION**

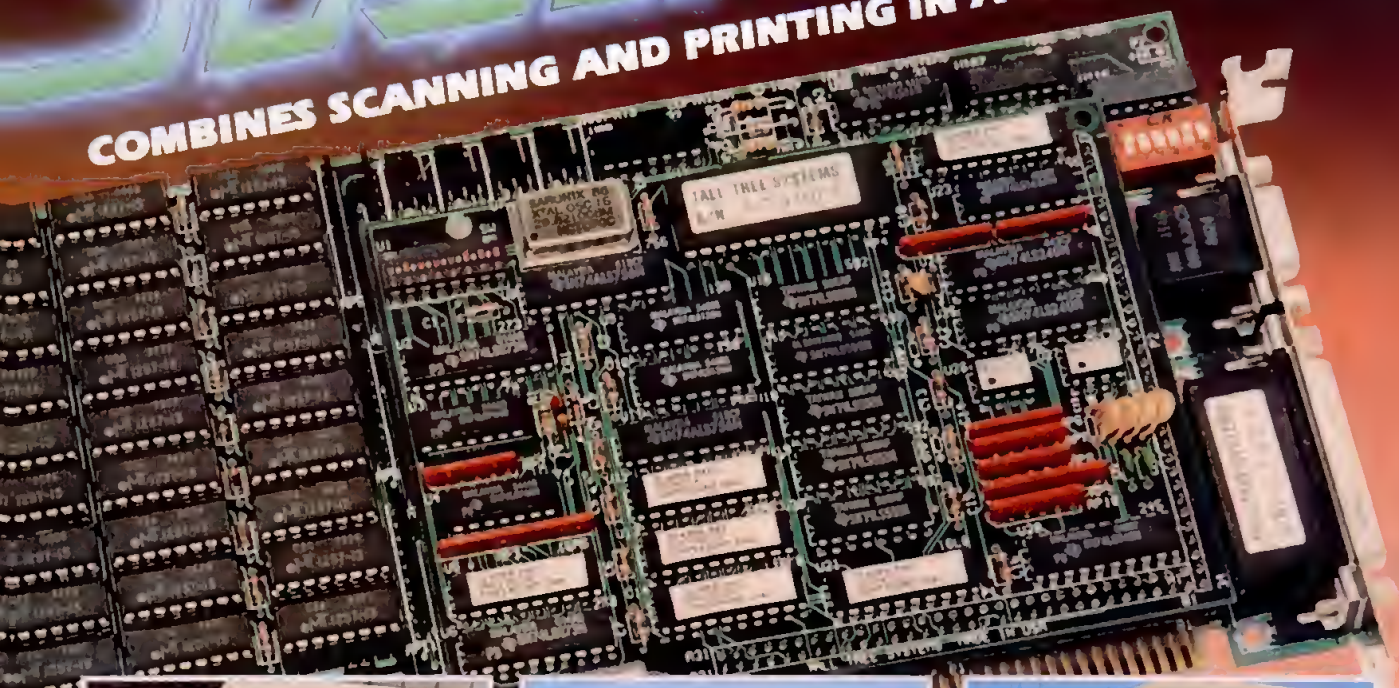
9230 MARKVILLE DR. DALLAS, TEXAS 75243

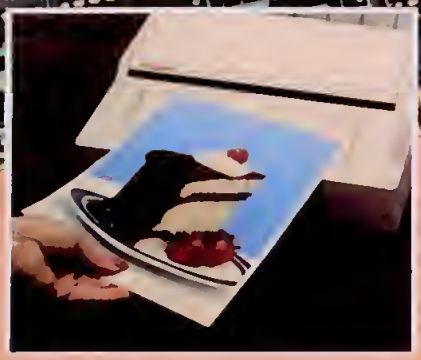
MINIMUM HARDWARE REQUIREMENTS
IBM-PC/XT/AT or compatibles and Tandy 1000/1200, 128K memory, one disk drive, PC-DOS, MS-DOS 2.0 or higher Color or monochrome monitor

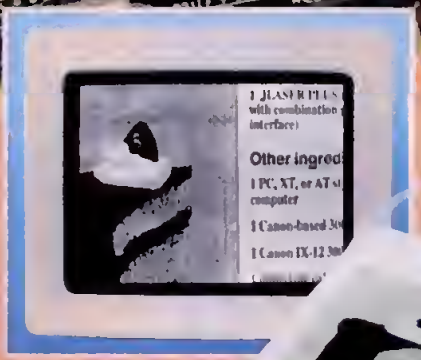
MS-DOS is a trademark of MicroSoft Corp IBM and PC-DOS 2.0 are registered trademarks of International Business Machine Corp Tandy is a registered trademark of The Tandy Corp Electric Pencil PC, Pencil Tutor and PC Proofreader are registered trademarks of Electric Software Corp

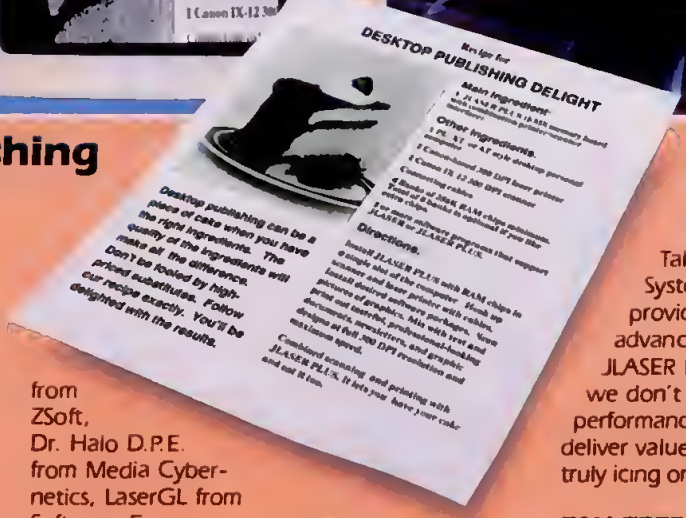
# JLASER PLUS

## COMBINES SCANNING AND PRINTING IN A SINGLE BOARD!










## It makes desktop publishing a piece of cake!

Tall Tree Systems introduces another breakthrough in desktop publishing with JLASER PLUS. We've combined a 2 MB EMS memory board and an interface to both a Canon®-based laser printer and scanner. JLASER PLUS increases the performance of both devices and gives you a low-cost solution to the limitations you've been experiencing with them.

Furthermore, the same memory that is made available to your printer and scanner is also available for all your other conventional applications. You get system memory, expanded LIM memory, extended memory in an AT-type machine, RAM Disk and print spooler — all in a single slot!

Supporting JLASER PLUS is a host of software packages, such as PC Paintbrush + from ZSoft, Dr. Halo D.P.E. from Media Cybernetics, LaserGL from Software Express, Ventura Publisher from Xerox, Page Builder from White Sciences, Le Print from Le Baugh Software, Fancy Font and Fancy Word from SoftCraft, Inc., and many more to be announced.

It takes a technological innovator like Tall Tree Systems to provide a major advancement like JLASER PLUS. And we don't stop at performance. We also deliver value, which is truly icing on the cake.

**TALL TREE SYSTEMS**
1120 San Antonio Road
Palo Alto, CA 94303
(415) 964-1980

CIRCLE 277 ON READER SERVICE CARD

**TALL TREE SYSTEMS**

Canon is a registered trademark of Canon Inc. All software packages listed are trademarks of their respective companies

©1986 by Tall Tree Systems. All rights reserved

that of the other PC bus connectors.

Other operating parameters are set with software and, as with the other PopCom modems, are retained only as long as the modem is supplied with power. The commands and compatibility of the C200/250 are also nearly identical to the rest of the PopCom line, with many of the same differences from and extensions to the Hayes command set.

The documentation of all three (or six) PopCom products rates as clear, if somewhat shallow. It is sufficient to get the products operating properly and is written in a very accessible style.

The *PFS:Access* program supplied with the -50 suffixed systems dovetails with the rest of the *PFS* software line: easy to use and powerful enough that the majority of users would require nothing more.

Although not bargain-basement wonders even with the software bonus, the PopCom products perform well. Although not necessary for the majority of communications needs, the added PopCom command refinements may furnish extra convenience in some applications.

**—Winn L. Rosch**

## Prometheus Products Inc.

While Prometheus Products isn't as much of a household name as Hayes is in the modem field, the company does have some strong credentials. Started in 1981 to produce Apple add-on products, the founders came across a new technology 3 years ago that allowed signal processing to be done digitally using a relatively inexpensive Intel 8031 microprocessor, instead of the large amount of analog circuitry that was, and still is, common in modem manufacturing. The company hired Tom McShane, one of the founders of Racal-Vadic and now one of the principals of Prometheus, and has since concentrated almost exclusively on modems.

By using all-digital signal processing, Prometheus found it could produce a very high-performance, low-cost product. And with 1987 sales projections of about $7 million, Prometheus is now in the "top 10" in retail modem sales.

There are some significant features that set Prometheus modems apart from the dozens of competitors. First is the attractive design of its modems. Their beige plastic case angles upward at the front and is covered by a translucent red plastic bezel. The sweeping bend makes it easy to read the front indicator lights hidden behind the front panel. The roomy, sturdy plastic case will comfortably hold a standard telephone on top without obscuring the modem's indicators from view. (All four external modems have identical cases, and are, in fact, virtually indistinguishable from one another).

However, style sometimes comes at a price, and the currency here is desk space. At 11½ by 6½ by 2¼ inches, the Prometheus modems are significantly larger than other products in their class. The Prometheus modems hog just enough extra desk space to be a problem in certain instances. For example, many users like to nest their modems under a tilt/swivel monitor on top of the system unit. With slimmer, Hayes-style products, this works fine. But the extra bulk of the Prometheus modems makes it impossible to adjust the monitor. A small point, but a significant one if you plan to put your modem under a monitor.

Otherwise, the Prometheus products are uniformly excellent, in terms of performance, price, and support. While the difference between the four external models reviewed is minimal (except, of course, for bit-per-second rate), they are important if you are interested in pushing the modem to its limits of functionality. Following are summaries of the four external and one internal modem from Prometheus.

**EXTERNAL 1,200-BPS MODEMS** The ProModem 1200 is a work of modem art. It is rugged, a solid performer, and relatively stylish. Moreover, it's quite easy to use despite its capability for some rather sophisticated operations.

In fact, if you are using standard communications products like *Crosstalk* or *ProComm*, you can pretty much unpack this modem, plug it in, and go in a manner of minutes. Part of the ProModem 1200's ease of use comes from its straightforward and trouble-free design.

First, there is no external transformer to mess around with. The power supply is inside the unit, so all you have to worry about is plugging in the integrated AC cord. The business end of the modem is in back, where there are two phone jacks, an on/off switch, a speaker volume control, and the RS-232C connector.

These features represent some intelligent choices. It's very nice to have both a line-in and a phone-out jack—if you don't think so, try using a product that doesn't have both. Not an insurmountable obstacle, but one that you don't need to deal with. Also, the on/off switch is a real convenience. If your office looks anything like the ones I frequent, you don't want the nuisance of crawling around on the floor and unplugging the modem if you want to turn it off.

Prometheus products are uniformly excellent, in terms of performance, price, and support.

Same goes for the volume control. It's easily accessible and extremely handy, especially if you use the modem for autodialing and get tired of listening to excess electronics.

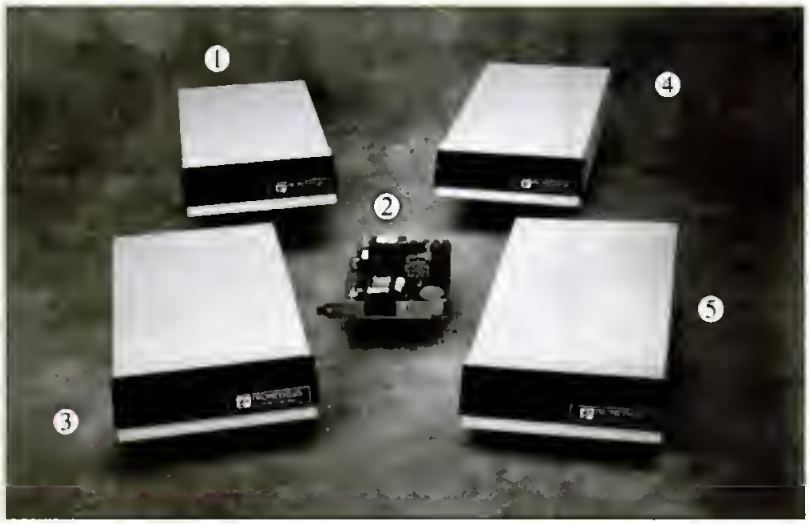
The front of the modem has eight indicator lights housed under the red plastic bezel: TD (transmit data), RD (receive data), OH (off hook), CD (carrier detect), HS (high speed), AA (auto answer), TR (terminal ready), and MR (modem ready). On the underside is a bank of ten DIP switches that can be used to govern various operating parameters like response to carrier detect and auto-redial. You may never need to deal with these switches, but if you do, the documentation contains a concise and helpful explanation.

In benchmark testing, both the ProModem 1200 and the ProModem 1200G performed satisfactorily, though neither could operate in answer mode without error when the line condition was at its worst.

As with the ProModem 2400 (reviewed

## FACT FILE

**Prometheus Products Inc.**
P.O. Box 4156; Fremont, CA 94539; (415) 490-2370




*You won't go wrong selecting a modem from the Prometheus line of products. All of the modems are dependable, and, in the case of the "G" models, priced competitively.*

**① Prometheus ProModem 1200**
**List Price:** $349; communications buffer (with 2K RAM and utility disk), $149; 512K RAM for buffer, $80; alphanumeric display, $199; extra printer port (serial or parallel), $49; PC Pack (*Mirror* software, cable, and utility disk), $89.
**Requires:** Serial port, RS232-C cable.
**In Short:** A rugged, 1,200-bps modem with the same excellent expansion options as its higher-speed brother. Worth the money, especially if you want the buffer and/or display but don't need 2,400-bps performance.
CIRCLE 678 ON READER SERVICE CARD

**② Prometheus ProModem 1200B/2**
**List Price:** $249
**Requires:** One half-length slot.
**In Short:** A true half-card modem complete with two phone jacks, external volume control, and communications software (*Mirror*). Good performance and value, especially if your PC (or your desk) is short on space.
CIRCLE 678 ON READER SERVICE CARD

**③ Prometheus ProModem 1200G**
**List Price:** $249
**Requires:** Serial port, RS232-C cable.
**In Short:** A fine value in a 1,200-bps modem. Solid performance, good construction, and an easy-to-read front panel.
CIRCLE 677 ON READER SERVICE CARD

**④ Prometheus ProModem 2400**
**List Price:** $499; Communications buffer (with 2K RAM and utility disk), $149; 512K RAM for buffer, $80; alphanumeric display, $199. extra printer port (serial or parallel), $49; PC Pack (*Mirror* software, cable, and utility disk), $89.
**Requires:** Serial port, RS232-C cable.
**In Short:** A very well-made, high-performance modem with excellent expansion options into a buffered, electronic message center. This is a fine product.
CIRCLE 675 ON READER SERVICE CARD

**⑤ Prometheus ProModem 2400G**
**List Price:** $399
**Requires:** Serial port, RS232-C cable.
**In Short:** A generic version of the ProModem 2400 designed to compete in price with low-cost clones. Excellent price/performance without the expansion capabilities of the 2400.
CIRCLE 674 ON READER SERVICE CARD

here), you can set up the 1200G through hardware or software, regulate the volume either way, and send it back to be fixed if it breaks down within 2 years—a pretty good deal. At $349, the ProModem 1200 is only $50 cheaper than the 2400G, so the decision would be whether you want 1,200-bps expandability or 2,400-bps speed without the expansion. (It's important to note, however, that for an additional $50 you get a modem that performs better at 1,200 bps. PC Labs testing showed that 2,400-bps modems performed much better at 1,200 bps than did 1200-bps modems. This finding was true across the board.)

The same is true for the ProModem 1200G, which has the same features and speed as the ProModem 1200, though without the display options. But at $249, it's a well-made (and U.S.-made) modem for the price.

The internal version of the 1200B/2 is a true half-card, internal modem. The 1200B/2 can be configured as either COM1, COM2, or COM3, but not COM4. It includes two phone jacks and a 2-inch speaker with an externally mounted volume control and will fit easily in any PC, XT, AT, or compatible.

The 1200B/2 has a set of eight DIP switches that must be set before the card is installed, since they are not otherwise accessible. The modem performed in seemingly identical fashion to its external brethren, though in benchmark testing it could not operate without error in answer mode. At $249, the modem also includes a copy of *Mirror*, a *Crosstalk* clone.

Like all the Prometheus products, the internal 1200B/2 seems to be extremely well made and offers good performance for the price. However, the 1200B/2 does not have the option of a communications buffer and alphanumeric display.

### ELECTRONIC MESSAGE CENTER

The ProModem 2400 is physically identical to its less speedy sibling and, therefore, is just as easy to use. After you plug it in and turn it on, what do you get? A high-performance, 2,400-bps modem with auto-answer and auto-dial, Hayes command set compatibility, voice/data switching, and superior construction. In benchmark testing at 2,400 bps, both the ProModem 2400 and the ProModem

# NewViews Accounting!

# Know Now!

### Know Why!
NewViews manages your accounting with a single consistent approach. One program, one manual, one price. No separate modules!

### Know How!
NewViews is accounting you can understand. You can see what you're doing, in real time. You no longer need modules, batches, journals, trial balances, charts of accounts, or systems flow diagrams, and you never have to close the books.

### Know Now!
To understand NewViews, reach for the phone. The illustration above is all you need to see how NewViews works and why it is completely different from all other accounting systems. When you understand, your search will be over.

### See NewViews in Action!
Call **(416) 923-4567** to reserve seats for a free seminar. They are ideal for evaluation, orientation and training.

### System Requirements
NewViews runs on IBM and compatible personal computers. It requires a hard disk, 256K RAM, any monitor, and DOS 2.0 or later. Information can be imported and exported to other popular software packages. Companies, reports, accounts, transactions, branches, departments. etc., are limited only by your disk. NewViews is not copy-protected.

### NewViews!
Complete Financial Accounting for $695.00
Q.W.Page Associates Inc. **(416) 923-4567**

1986 Winner of PC Magazine's Award for Technical Excellence

PC MAGAZINE

## SCHEDULE OF FREE SEMINARS — MARCH 23 THROUGH MAY 29, 1987

**ATLANTA** Apr. 8, May 6, May 20, **BALTIMORE** Apr. 3; **BOSTON** Mar. 23, Apr. 10, Apr. 21, May 11; **BUFFALO** Apr. 9; **CHICAGO** Mar. 30, Apr. 22, May 4; **CINCINNATI** Apr. 2, May 8, **CLEVELAND** Apr. 7, May 12; **COLUMBUS** Apr. 3; **DALLAS** Apr. 3, Apr. 23, May 11, **DENVER** Mar. 24, Apr. 29, May 20; **DETROIT** Apr. 8, Apr. 21, May 13; **FRESNO** Apr. 7, May 12; **GREENSBORO** Apr. 1, Apr. 30, May 28, **HARTFORD** Apr. 23, May 13, **HOUSTON** Mar. 30, Apr. 21, May 15; **INDIANAPOLIS** Apr. 1, May 7; **JACKSONVILLE** May 4; **KANSAS CITY** Mar. 23, Apr. 27; **LONG ISLAND** Apr. 6, May 22; **LOS ANGELES** Apr. 8, Apr. 22, May 14, **MEMPHIS** Apr. 6, May 8; **MIAMI** Mar. 23, May 1; **MILWAUKEE** May 5; **MINNEAPOLIS** Mar. 20, Apr. 24; **MONTREAL** Mar. 24, May 12, **NEW ORLEANS** Mar. 27, Apr. 27, May 18, **NEW YORK** Mar. 25, Apr. 7, Apr. 24, May 14, **ORLANDO** Mar. 20; **OTTAWA** Mar. 23, May 11, **PHILADELPHIA** Mar. 27, Apr. 27, May 25; **PHOENIX** Mar. 23, Apr. 20, **PITTSBURG** Apr. 6, May 11; **PORTLAND** Mar. 31, May 4; **PROVIDENCE** Apr. 9, **SACRAMENTO** Apr. 24, **SALT LAKE CITY** Mar. 25, Apr. 27, May 22; **SAN ANTONIO** Apr. 1, May 13; **SAN DIEGO** Apr. 10, May 15; **SAN FRANCISCO** Apr. 6, Apr. 30, May 11, May 29, **SAN JOSE** May 26, **SEATTLE** Apr. 1, May 5; **ST. LOUIS** Mar. 27, May 1; **TAMPA** Mar. 25, Apr. 29; **TORONTO** Mar. 26, Apr. 16, May 7, May 21; **VANCOUVER** Apr. 2, May 7; **WASHINGTON** Mar. 30, Apr. 28, May 26.

CIRCLE 104 ON READER SERVICE CARD

2400G performed on a par with the majority of the other 2,400-bps modems we tested. What sets the ProModem 2400 apart from most other products is its capability to be expanded into what Prometheus calls an electronic message center.

An optional communications buffer and an alphanumeric display are available, and they can really upgrade the ProModem. The communications buffer ($149) comes with 2K of RAM but can be expanded to 512K of battery-backed, CMOS RAM, which Prometheus sells for $80. However, you can also socket in any standard 64K or 256K chips that run at 150 nanoseconds or faster.

The buffer allows the modem to answer the phone, send or receive files, and print (with an optional parallel or serial port) messages independent of the computer. This contributes a great deal of the functionality of a product like the Hayes Transet 1000, but all in a single package. While it might take a bit of time to set up the buffer for advanced usage, it is well worth the investment. Alternatively, the buffer can be used as a print spooler.

The alphanumeric display plugs into the communications board, meaning that you need to have the buffer. At $199, it's a frill, but it's a great frill. To start with, the display will show the current time and date and, during on-line sessions, will also display the connect time—a real boon if you want to keep track of how much money you're spending on The Source, CompuServe, or other on-line databases. It also displays modem functions in English—showing the number being dialed, phone status, and just about anything else that your modem could possibly tell you. With or without the display, the ProModem 2400 is a super modem.

**LOWER-PRICED "G" SERIES**

The ProModem 2400G is essentially the ProModem 2400 without the expansion options. The fundamental circuitry, the case—everything is the same, but it lacks the option to add the buffer and the alphanumeric display. In the bargain, you get the fine performance of the ProModem 2400 for $100 less. At $399, the ProModem is a great value and is obviously designed to compete with the low-priced, off-shore clone modems. If you can tell it apart from the ProModem 2400, call me. It is exactly the same—unless, of course, you've got a ProModem 2400 loaded with the buffer and display and so on. Otherwise, the only difference I could find between the two was that the manual of the 2400 was printed in color, and the manual of the 2400G was printed in black and white. No kidding. You have to sacrifice something for $100, right?

If you're looking for dependable 2,400-bps communications in a solidly made product with all of the basic features of a high-performance modem, this is worth looking at. All right, so you can't store the telephone numbers of everyone you ever knew inside the modem. But that's why you bought a computer, isn't it? This is a small price to pay for reliable, high-speed communications.

In general, the modems from Prometheus are to be highly recommended. They work well and offer some exceedingly nice expansion options in the 2400 and 1200 models, and some attractive price savings in the "G" series. On an overall price/performance basis, these are simply excellent products with very few (and only minor) drawbacks.—**Jon Pepper**

## Quadram Communications Group

As a veteran of the bitterly fought PC add-in board wars, Quadram Communications Group has developed a reputation for marketing products that give users solid performance with a minimum of fuss. The company has extended this philosophy to the modem board field, where its Quadmodem II series furnishes reliable—if not particularly inspiring—performance.

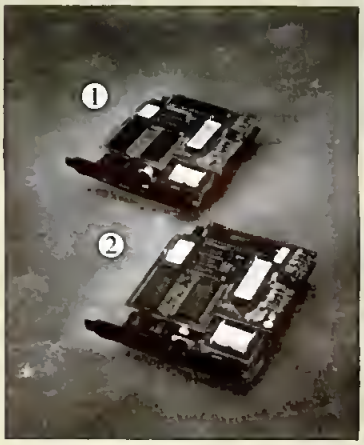
There are a pair of Quadmodem II models: the Quadram QM2000, which operates at 300 or 1,200 bits per second, and the Quadram QM2024, which handles data at 300, 1,200, or 2,400 bps. Both products are Hayes compatible and fit (albeit with some effort) into an XT short slot.

Ease of installation depends on which slot you've selected for your Quadmodem. If you sacrifice a full-length slot, the task is about as painless as any add-in board installation can be. Unlike IBM's internal modem, there's no speaker wire to connect, and the only required preinstallation procedure involves moving some pins to set the correct COM port. (AT users must move another pin and set a DIP switch to get the board to recognize their machines.) The Quadmodems support COM ports 1 through 4.

The card's rear panel fits perfectly against the XT's backplate and the unit can be installed in something under 5 minutes

### PC MAGAZINE FACT FILE

**Quadram Communications Group**
Asher Technologies Inc.
1009 Mansell Rd.
Roswell, GA 30076
(404) 993-4590




*Quadram Corp.'s two internal modems perform simply and solidly.*

① **Quadram Quadmodem QM2000**
**List Price:** $425; 2,400-bps upgrade, $247.
**Requires:** One half-length slot
**In Short:** A 1,200-bps modem card that can be easily upgraded to 2,400-bps. It's not the best or cheapest modem available, but once installed it's a no-fuss performer.
CIRCLE 610 ON READER SERVICE CARD

② **Quadram Quadmodem QM2024**
**List Price:** $699
**Requires:** One half-length slot.
**In Short:** A good performer at both 1,200 and 2,400 bps.
CIRCLE 609 ON READER SERVICE CARD

**WHAT TO LOOK FOR IN A DIAL-UP MODEM** **1-800-822-8224**

# 19,200 bps.

Microcom puts its cards on the table. Announcing the PC/9624c card modem. The world's fastest internal modem for your IBM™ PC or compatible personal computer. And two other card modems that are the fastest in their class. The PC/2400c and PC/2400.

The new PC series is the only modem card family that delivers speeds up to 19,200 bps. 100% error free.

But don't make the mistake of thinking the world's fastest and most accurate modems exact a heavy toll on your monthly phone bill. Exactly the opposite is true.

**YOU GET WHAT YOU PAY FOR.**

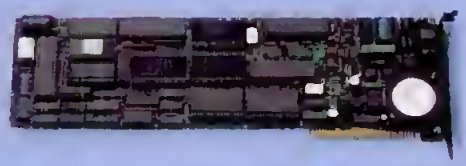
*Comparative costs of sending 360,000 bytes of data over dial-up phone lines*

| Product | Throughput | Transfer Time | Cost of call ($20/hr) |
|---|---|---|---|
| Generic Modem | 2400 bps | 25 min. | $8.33 |
| **PC/2400** | **2900 bps** | **20 min., 41 sec.** | **$6.90** |
| **PC/2400c** | **5000 bps** | **12 min.** | **$4.00** |
| **PC/9624c** | **9600 bps** | **6 min., 15 sec.** | **$2.08** |
| **PC/9624c** | **19,200 bps** | **3 min., 7 sec.** | **$1.04** |

# Modem Card.

Our new PC card modems give you everything you expect from a Microcom modem. Microcom is the leader in dial-up error-correction technology and the inventor of MNP™ – Microcom Networking Protocol™ – the recognized industry standard.

The new PC card modems from Microcom. Call us for the inside story: 1-800-822-8224 (In MA dial 617-762-9310).



- *Hayes™ compatible*
- *CCITT V.22 bis compatible*
- *Upgradeable*
- *Standalone configurations available*

**IT'S ALL IN THE CARDS.** Send for complete details on the PC/9624c, PC/2400c and PC/2400. Mail to Microcom, 1400 Providence Highway, Norwood, MA 02062.

Name _____ Phone _____

Title _____ Company _____

Address _____

City _____ State _____ Zip _____

PC-5/12/87

MICROCOM™

Microcom, MNP and Microcom Networking Protocol are trademarks of Microcom, Inc. Hayes is a trademark of Hayes Microcomputer Products. IBM is a trademark of International Business Machines.

CIRCLE 388 ON READER SERVICE CARD

—ready to run

$795.00

## Price includes

- Monochrome amber monitor
- Mono video card
- 360K disk drive
- 256K memory
- Turbo mode indicator light on CPU
- Built-in game port
- Hardware reset
- MS DOS 3.2
- GW BASIC
- Printer port
- Word processing, spreed sheet and data base software
- 10 blank floppy disks
- One year limited warranty
- Key lock for security
- Hard disk access light
- AT style keyboard
- RAM expandable to one megabyte on mother board
- Keyboard selectable clock speed (4.77/8 MHz)
- 8 expansion slots
- Clock calendar with battery back-up
- FCC approved

30-day money back guarantee

## PRO/88 Turbo

$449.00

## PRO/88

- 360K disk drive
- 256K memory
- 1 year limited warranty
- 4 layer mother board
- 30-day money back guarantee

$895.00

## PRO/286

- 286 speed
- 200 watt power supply
- One year limited warranty
- Key lock for security
- Hard disk access light
- AT style keyboard

# PC Engineering

1450 N. First St., Garland, TX 75040

### Monitors

| | |
|---|---|
| Samsung 12" amber with swivel base | 99.00 |
| Amdek 310A | 145.00 |
| RGB Color 13" hi. res | 349.00 |
| EGA Color 13" EGA monitor | 549.00 |

### Video Cards

| | |
|---|---|
| Color Graphics Card with printer port | 69.00 |
| Color Grephics Cerd | 59.00 |
| EGA Card with 256k | 289.00 |
| Mono Video Card with printer port | 85.00 |
| Mono Grephics Cerd with printer port | 69.00 |

### Disk and Tape Storage

| | |
|---|---|
| Floppy Drive—½ height | 99.00 |
| 20 Meg HD w/controller | 399.00 |
| 30 Meg HD w/controller | 499.00 |
| Tape Back-Up | 424.00 |
| 1200 B Internal Modem | 149.00 |

### Add-on Cards

| | |
|---|---|
| RS232 Cerd | 29.00 |
| Printer Cerd | 19.00 |
| Hard/Floppy Disk Controller, all on one card | 199.00 |
| Multifunction Card/384k memory Floppy Cont., Clock/Calendar, Seriel and Printer Ports and Game Port—plus up to 384k | 99.00 |
| AT Add-on Cards | Call |

### Printers

| | |
|---|---|
| Cannon A40 80 col. 140 cps w/NLQ | 328.00 |
| Cannon A55 132 col. 180 cps w/NLQ | 599.00 |
| Fujitsu 2200 132 col. 220 cps w/NLQ | 695.00 |
| Fujitsu 2100 80 col. 220 cps w/NLQ | 495.00 |
| Printer Cable 10 ft. | 15.00 |

### Local Area Networks

| | |
|---|---|
| D-Link Network Interface | 395.00 |
| D-Link Starter Kit | 790.00 |
| D-Link Cluster Kit | 60.00 |
| Remote Boot ROM | 50.00 |
| Novell Emulator | 150.00 |
| Screen Monitor | 150.00 |

Outside Texas

1-800-843-1581

Inside Texas and Technical support

1-214-276-1603

MasterCard, VISA, American Express

*PC Engineering is owned and operated by registered professional engineers*

CIRCLE 483 ON READER SERVICE CARD

(if you're in a hurry). A note of caution: since both Quadmodems consist of a pair of stacked circuit boards, each is a very thick package. Should a neighboring board's component leads extend very far from its circuit board, a short circuit between the two cards is a definite possibility. Before powering up a Quadmodem-equipped computer, you should carefully examine your installation to make sure the modem isn't touching any other expansion cards.

Mounting the modem in an XT's short slot isn't quite as pain-free as a full-slot installation. I know of a hotel chain that refers to its Las Vegas and Atlantic City casinos as "slotbusters territory." The PC expansion board industry, I think, can lay claim to a similar stretch of turf.

Like most board manufacturers, Quadram is prone to exaggerate the definition of a half-card to its utmost limit. Trying to wedge the pudgy Quadmodem between the XT's back panel and disk drives is a formidable chore that requires some head scratching, a lot of elbow grease, and an appropriately worded prayer or two.

By carefully routing the drive cables away from the card and gently rocking the board downward into the slot, you will eventually be able to install the modem. Plus, you'll have a story to tell your grandchildren 20 years from now.

With the card neatly tucked away inside your PC, all that's left to do is connect the supplied cable from a nearby telephone line to one of the Quadmodem's two interchangeable RJ-11 phone jacks. A telephone may be connected into the other jack.

**TOTAL HAYES SUPPORT** Using either one of the Quadmodems differs very little from using any other internal modem. Unlike an external modem, the device is hidden away inside your machine, and you become aware of its existence only when you decide to place a call to an on-line database, bulletin board, or information service. Since both modems provide complete Hayes AT command set support, they are compatible with virtually every telecommunications program on the market. For those who don't already have a favorite program, the modems are bundled with the venerable *Crosstalk XVI* package.

In action, the Quadmodems work quietly and effectively. In PC Labs tests comparing the Quadmodems to modems sold by other manufacturers, the units exhibited a resistance to line noise that placed them near the top of the pack. At 1,200 bps, both Quadmodems generally outperformed the Hayes Smartmodem 1200B and kept pace with 1,200/2,400-bps products sold by IBM, General Datacomm, Ven-Tel, IDEAssociates, and Novation. At 2,400 bps, the 2,400-bps Quadmodem performed about as well as modems marketed by Hayes, IBM, Racal-Vadic, and Novation.

Compared to some other modems, the Quadmodem boards don't offer many internal features. Hayes compatibility is just about the whole story. There's no on-board buffer, protocol support software, or phone number directory. At one time, the lack of such options would have been glaring omissions. But since most telecommunications packages now have all of these features and more, the dearth of internal software isn't so important. Anyway, when better protocols come along, it's easier to upgrade software installed on a disk than in read-only memory.

The Quadmodems' construction is first-rate. On the boards I tested, the solder joints were bright and shiny, and I didn't see any evidence of post-manufacturing touch-ups to the connections. Some of the exposed leads were bent, however, which can make replacing a part more difficult than necessary. Nevertheless, the boards use high-quality, high-tolerance components and gold-plated connectors (except, mysteriously, on the telephone jacks). All of these are signs of a product that should give reliable service for many years.

I also appreciated the placement of the Quadmodems' speaker control. Unlike many other modem boards, which locate a tiny potentiometer on the circuit board itself, the Quadmodems' control knob is mounted in an easily accessible spot on the card's outside rear panel.

**2,400-BPS UPGRADE** One interesting aspect of the Quadmodems' stacked construction is that the top circuit board can be detached and replaced with a new board containing higher-speed circuitry. For example, the 1,200-bps Quadmodem can be converted into a 2,400-bps unit by merely popping off one card and snapping on another. The process takes about a minute, costs $274, and requires no soldering or other technical expertise. As modem speeds inch ever-upward, Quadmodem owners will be able to upgrade their units accordingly.

The Quadmodems' documentation isn't elegant, but it gets the job done. At first glance, the documentation package, which is over an inch thick, appears to contain an overwhelming amount of material on the Quadmodems. But closer examination shows that the bulk of the manual is dedicated to the operation of the accompanying *Crosstalk* software; only about 50 pages actually touch on the modems' installation and operation.

Still, the manual is well written and understandable. It includes information on setup and installation, a rundown of the Hayes AT command codes, and several appendixes of technical information, primarily of interest to programmers and hobbyists. Missing is a troubleshooting section. If you're lucky enough to get your modem running right away, you probably won't miss a troubleshooting guide. But if luck isn't on your side and you run into trouble somewhere along the line, you'll have little choice but to contact Quadram's customer-assistance personnel.

At $425 for the 1,200-bps unit and $695 for the 2,400-bps version, the Quadmodems aren't the cheapest modems on the market. They also aren't the best performers or the units with the most exciting features. Nevertheless, they are well made, seem reliable, and can get you on-line with a minimum of fuss.

**—John Edwards**

## Racal-Vadic

For 17 years, Racal-Vadic has specialized in computer communications products. Its modems have long been considered workhorses in the industrial market, but the company has only recently moved into the PC area. There's no reason to think that Racal-Vadic's PC products will not achieve the same tough-as-a-brick reputation as did the products with which the company earned its stripes.

The Racal-Vadic Maxwell 2400VP

from the company's Maxwell line of PC modems is a thorough delight. This modem includes all of the features normally found in PC modems with those previously seen only in the mainframe communications market.

Within the handsome enclosure rests a circuit board of exceptional quality. While the logic circuitry is firmly soldered into place, all of the major components (Rockwell modem chips, ROM, and microprocessor) are socketed, making them easy to replace. A hefty speaker fires through slots in the bottom panel, making the line-connection activity audible in even the busiest environments.

What seems to be missing from the 2400VP board is the usual bank of DIP switches: all of the communications parameters are set by keyboard commands or five touch switches on the front panel. These switches can be used to put the modem on-line, change speed, enable auto-answer ability, select synchronous mode, and initiate the self-tests. An LED above each switch indicates that it has been pressed or that the function has been initiated by a keyboard command.

In PC Labs line-noise testing, the Maxwell 2400VP lived up to Racal-Vadic's fine reputation for high performance.

Five more LEDs indicate power-on, transmit data, receive data, carrier detect, and whether or not the error-correction protocol is in effect.

In PC Labs line-noise testing, the 2400VP lived up to Racal-Vadic's fine reputation for high performance. Moreover, its versatility sets it apart from the pack. With a built-in dialing directory, it is equally at home with a plain terminal as it is with a PC. As many as 15 phone numbers and log-on sequences of up to 60 characters can be stored in the electrically erasable programmable read-only memory (EEPROM) chip. If need be, two memory locations can be linked together to allow for messages of 120 characters.

The 2400VP supports the ATPlus expanded set of Hayes commands, along with commands unique to Racal-Vadic. The proprietary commands are for such functions as storing numbers in memory or enabling the error-correction mode. Executing the AT*T1 command will display a list of all of the commands and their current settings. Similarly, typing "AT*T" will show all 28 registers, their purpose, and the decimal values they contain.

The documentation supplied with the review unit was marked "preliminary," but it was nevertheless well organized and complete. The numerous examples made quick work of putting the unit into service.

**ERROR CORRECTION** Error correction has been used in mainframe communications devices for years but has only recently come to a select few PC modems. The 2400VP supports the Microcom network protocol (MNP) and will select it automatically if it receives the proper handshake from the modem at the answering end (you'll know it's active by the EC light on the front panel). Such error correction allows ASCII text files to be transmitted between two similarly equipped systems with impunity. Software file-transfer protocols, such as Xmodem or Kermit, can be used together with this error correction for added insurance.

In all, the 2400VP brings a number of features formerly found only on very expensive mainframe modems to the PC community at a very competitive price. With its versatility, power, and features, it will not soon become obsolete. If there's one modem that really stands out in this crowd of clones, the 2400VP is it.

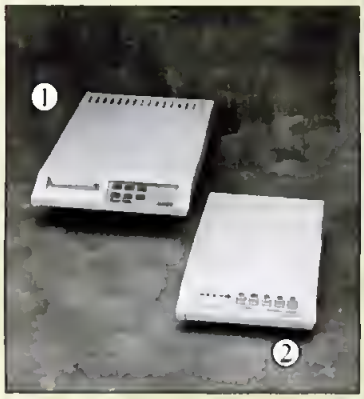
Racal-Vadic's 2400PA external modem is something of a fish out of water in the PC environment. While its Maxwell 2400VP was designed for the PC market, this unit comes from company's industrial product line.

The mammoth 8- by 13-inch enclosure will not only fit under just about any telephone but perhaps a few of the smaller-model Cadillacs as well.

Opening up the attractive plastic case reveals why the 2400PA is so portly. Built without any VLSI (very large scale integrated) components, the two piggybacked boards contain no less than 66 integrated

## PC MAGAZINE FACT FILE

**Racal-Vadic**
1525 McCarthy Blvd.
Milpitas, CA 95035
(408) 946-2227




*Racal-Vadic modems combine Hayes compatibility with extra features.*

EDITOR'S CHOICE

① **Racal-Vadic Maxwell 2400VP**
**List Price:** $595
**Requires:** One RS-232 serial port, a serial cable, communications software.
**In Short:** The Racal-Vadic Maxwell 2400VP offers outstanding performance, full Hayes ATPlus command compatibility, and advanced features, like error correction, at a truly competitive price.
CIRCLE **688** ON READER SERVICE CARD

② **Racal-Vadic 2400PA**
**List Price:** $795
**Requires:** One RS-232 serial port, a serial cable, communications software.
**In Short:** The Racal-Vadic 2400PA, while offering fine performance and an internal dialing directory, is one of the few modems not compatible with the standard Hayes command set. With only Class A FCC certification, it should be left to the office and industrial crowd.
CIRCLE **687** ON READER SERVICE CARD

circuits and about twice that many discrete components. All but the ROM chips are soldered directly to the boards. While of generally high quality, the board does have two wire jumpers soldered between IC legs.

However, it would be unusual for most users to open up the case because the 2400PA lacks the usual array of configuration DIP switches. All of the communications settings are done either through keyboard controls or the ten front-panel switches. Also curiously missing is a speaker for monitoring line-connection activity.

Don't plan on buying a Racal-Vadic 2400PA for use at home. It's certified only for Class A FCC service.

On the back of the box are connectors for an RS-232 serial cable, the external power supply, telephone, and phone lines. The phone jacks can be used with the conventional RJ-11 connectors as well as RJ-41/RJ-45 plugs.

The front-panel switches control communications rates, originate/answer mode, line connection, redialing, and selection of a whopping seven self-test modes.

In keeping with its large-system ancestry, the 2400PA is one of the few modems around that does not support the Hayes AT command set. Rather, it uses Racal-Vadic's own set of commands for operation. Once a connection is made between the modem and a PC or terminal, typing Ctrl-E puts the device into command mode. It dutifully responds with "HELLO: I'M READY", followed by an asterisk (*) prompt. At this point, the modem can be directed to dial a number from its internal directory of up to 15 numbers, complete with 60-character log-on sequences.

A word of caution—the dialing directory is contained in low-power CMOS RAM backed up by a 3-volt lithium battery, but the battery comes into play only when the power is interrupted. Powered up all the time, the battery is designed to last for 10 years (its shelf life), but it will last only 2 years with the power off. Because it's soldered firmly into place, replacement will mean a trip to the repair shop.

The most significant features of the 2400PA are the Modem Manager and security system. The Modem Manager allows a remote terminal to update memory contents, change options, and execute commands—such as initiating a remote digital loopback test. The security feature prevents accidental or deliberate changes to the modem's internal memory by local users or those calling in from a remote site. The pages of the manual devoted to security are perforated and are designed to be removed by the person in charge.

One final note: don't plan on buying a 2400PA for use at home. It's certified only for Class A FCC service, suitable for use in an office or industrial environment—not the more stringent class B certification required for residential use.—**Frank Bican**

## SmarTEAM Inc.

Many hardware clones are manufactured or assembled in third-world countries in which labor is cheap and plentiful. As a result, the product is usually priced lower than the archetype. And maybe, though not always, the quality of the construction is not as good. SmarTEAM is a California company whose parent company, Team Technology, manufactures modems in Taiwan that look and act much like Hayes Smartmodems but do not quite measure up to the originals.

SmarTEAM offers three modems: the SmarTEAM 2400 external ($599; includes *Quick Link* software), the SmarTEAM 2400B half-card internal ($599; includes *Quick Link*), and the SmarTEAM 1200AT external ($299; includes *Quick Link*). The company expects to release another model, the SmarTEAM 1200B half-card internal ($299; includes *Quick Link*) soon.

The SmarTEAM 1200AT is a 0 to 300/1,200 bit-per-second clone. With its brushed-aluminum case and eight LED front-panel lights, it closely resembles the Hayes Smartmodem 1200B. The volume control dial, RS-232C connector, power input, on/off switch, and RJ-11 jacks are accessible from the rear. Setup is simple enough to accomplish: just pry off the front plastic panel and set the eight configuration DIP switches.

In tests at both 300 and 1,200 bps, the modem was completely Hayes AT command set compatible. It can auto-dial, auto-answer, tone- or pulse-dial, and recognize the terse or verbose command set. There are no added features here, no help screen or modem clock, and no internal telephone number storage. PC Labs subjected the 1200AT to a number of tests to determine its resistance to line noise, and it produced mixed results. Under ideal conditions, the 1200AT would transfer data easily, but on an exceptionally noisy line it encountered many problems and could not complete a file transfer. The Hayes Smartmodem 1200, on the other hand, completed the transfer with little difficulty.

Moving up in quality and price, SmarTEAM offers the 2400 external modem. It, too, is a Smartmodem knockoff with a handsome brushed-aluminum exterior and dark plastic panels on the front and rear of the unit. The volume control dial, which is located on the back between the power input and the RS-232C connector, is very difficult to turn and almost impossible to get to once you have installed the cables. The transformer is one of the largest I have ever seen for a modem, but the line is 12 feet long, so you can plug in the unit in the other room.

Setup is accomplished either through the ten DIP switches that are located behind the front panel or by using the default software settings available from nonvolatile ROM. You can change the configuration and then save the new setting with a software command. The SmarTEAM 2400 is completely compatible with the Hayes command set and will operate at 0 to 300, 1,200, or 2,400 bps with automatic rate fallback. The eight indicator lights on the front panel are the same as the SmarTEAM 1200AT: MR (modem ready), TR (terminal ready), CD (carrier detect), SD (send data), RD (receive data), HS (high speed), AA (auto answer), and OH (off hook).

# In the new world of the IBM Token-Ring network it's nice to see an old familiar face.

The Token-Ring LAN is a reality. It shouldn't surprise you that IBM™ was the company that developed it. It should be equally unsurprising that the technology that best allows the Token-Ring to communicate with the mainframe comes from DCA, the makers of IRMA.™

Introducing IRMALAN.™

IRMALAN is a new family of software and hardware products that can exploit the full power of PCs on the Token-Ring and other NETBIOS-compatible LANS: IRMALAN SNA Workstation™ is software that provides the PC with the 3270 functionality of IRMA; IRMALAN APA Graphics Workstation™ transforms a PC on a LAN into a mainframe graphics workstation. It can also store, print, plot and redisplay graphs right at the PC.

The IRMALAN family includes gateways that connect Token-Ring networks to both DFT controllers and SDLC communication lines.

Best of all, IRMALAN can do all that with the ease and simplicity of IRMA. Which means your users can feel as comfortable working with IRMALAN now as they have been working with IRMA.

To find out more about DCA's IRMALAN, call us today at 1-800-241-IRMA, ext. 518.

dca®

CIRCLE 541 ON READER SERVICE CARD

*IRMA, IRMALAN, IRMALAN SNA Workstation and IRMALAN APA Graphics Workstation are trademarks of and DCA is a registered trademark of Digital Communications Associates, Inc. IBM is a registered trademark of International Business Machines Corporation. © 1986, Digital Communications Associates, Inc.*

**GOOD DATA TRANSFER** The SmarTEAM 2400 doesn't offer much more than these basics. It can store one telephone number to be called later, but that's no big deal. There is no clock or built-in error-checking protocol. A help screen would be nice, or even a larger command buffer (40 characters is the maximum). But when it comes to data transfers, the SmarTEAM 2400 performs admirably, almost as well as its Hayes counterpart. In PC Labs noise resistance tests, the 2400 performed well under all simulated line conditions. From clean lines to cluttered lines, the SmarTEAM results were almost as good as the standard-bearer, the Hayes.

The other 2,400-bps modem from SmarTEAM is the 2400B half-card internal. This modem can't be called a clone because it doesn't look like the Hayes Smartmodem 2400B (which is a full-length card), but it can do many of the same things. You can operate the SmarTEAM 2400B from 0 to 300, 1,200, or 2,400 bps, and it has automatic rate fallback. This is a half card, so you should be able to install it in any slot, but the card is too long ($7^{9}/_{16}$ inches) to fit into a standard XT short slot.

The 2400B arrives from the factory set to COM1, but you can quickly change it to COM2 by rearranging the pin combination before you install the modem. The configuration options can be set with the ten DIP switches accessible from the back of the card or can be retrieved from nonvolatile ROM. If you decide to change the configuration by issuing software commands, the new setting can be saved in nonvolatile memory. A volume-control dial and two labeled RJ-11 phone jacks are also available on the back of the modem bracket.

I tested the modem for compatibility with the Hayes AT command set and found it to be compatible at 300, 1,200, and 2,400 bps. The SmarTEAM 2400B will respond with terse or verbose responses and recognizes the same dialing commands as the Hayes 2400 series. Although it's similar in features to the SmarTEAM 2400 external, the buffer holds only 40 characters, and the modem will store only one telephone number in memory. The documentation is adequate, though not as thorough as the Hayes manual.

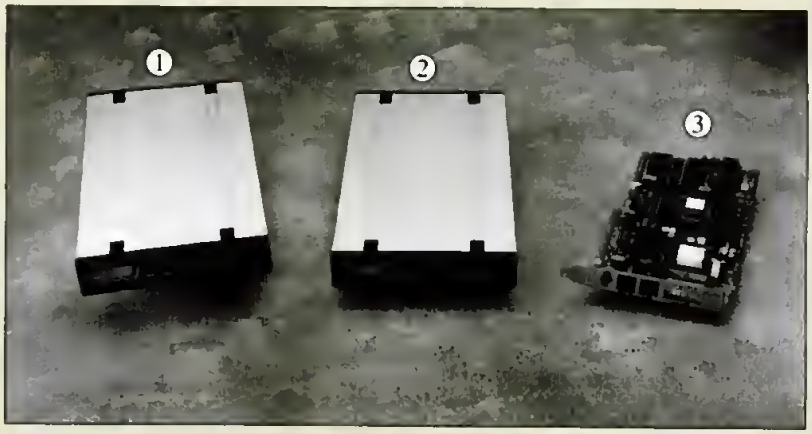
This model made a good showing in line noise resistance tests. When subjected to increasing line noise during a data transfer, the 2400B consistently overcame the obstacles and completed the transfers. The results were not quite as good as the Hayes Smartmodem 2400B, but they were acceptable. For a midpriced 2,400-bps modem that uses a three-quarters-length slot, the SmarTEAM 2400B might be just what you are looking for.

All three SmarTEAM modems come bundled with communications software. *Quick Link*, a bare-bones program from Smith Micro Software, was in two of the packages, and *Mite*, a subset of *Dyna Mite*, from Mycroft Labs, was in the third. A company representative said that *Quick Link* will be included in all future packages. But don't buy one of the modems for the software: *Quick Link* will get you up and running, but you'll discover that it is practically featureless, and if you plan to do anything more than rudimentary telecomputing, you'll want to buy a better communications program.

If you take all the factors into consideration, such as price, ease of use, Hayes compatibility, and the ability to perform efficient data transfers, the SmarTEAM 2400 series looks like a better buy than its 1200AT. The telecommunications world is moving quickly to the 2,400 standard; SmarTEAM makes 2,400-bps clones worth considering. **—Christopher Barr**

## PC MAGAZINE FACT FILE

**SmarTEAM Inc.**
19205 Parthenia St.; Northridge, CA 91324; (818) 886-9726




*SmarTEAM's external modems closely resemble the Hayes Smartmodem. Though the quality isn't as high, the price of the 2,400-bps model makes it worth considering.*

① **SmarTEAM 1200AT**
**List Price:** $299
**Requires:** Serial port, RS-232C cable.
**In Short:** A 300/1,200-bps modem that looks like a Hayes but can't transfer data over cluttered lines the way a Smartmodem can.
CIRCLE **684** ON READER SERVICE CARD

② **SmarTEAM 2400**
**List Price:** $599
**Requires:** Serial port, RS-232C cable.
**In Short:** A 300/1,200/2,400-bps modem that doesn't have any fancy features but will conduct data transfers almost as efficiently as the Hayes Smartmodem 2400.
CIRCLE **683** ON READER SERVICE CARD

③ **SmarTEAM 2400B**
**List Price:** $599
**Requires:** Half-length slot.
**In Short:** A 300/1,200/2,400-bps half-card modem that performs well but is too long to fit into a standard PC-XT short slot.
CIRCLE **682** ON READER SERVICE CARD

## Tek-Com Corp.

The age of the lumpen modem is upon us. On desktops everywhere, clone modems are filling the bare minimum requirements needed to emulate the Hayes Smartmodem: AT command set compatibility for running readily available PC software, data transfer at 300 and 1,200 bits per second, and a warranty of at least 1 year. Some have more extensive features, and some don't. The Tek-Com-212AD modem from Tek-Com Corp., of San Jose, California, is one that doesn't. It's a me-too modem that works when you turn it on but doesn't dazzle. However, it's also a fraction of the Hayes Smartmodem 1200's cost.

The TC-212AD is easy to install. There are only three things to plug in: a power supply, a phone line, and a serial cable, and all of them connect easily, so it's hard to go wrong. You have to supply your own serial cable and run it from the TC-212AD to a serial port in your PC. In order to have a voice phone on the same line as the TC-212AD you'll have to buy a Y jack, which you can get for about a dollar at any Radio Shack outlet.

There is no volume control knob, so one sound fits all. The only speaker options are those available at the AT command level (speaker on, speaker off, and speaker on until connection). The speaker is quiet but not impossible to hear. There are no switches to set inside, so opening up the TC-212AD is pointless. Everything the modem can do is addressable from the keyboard, so there's no DIP switch/jumper muss and fuss.

The TC-212AD lets out three beeps on power up to signal that the serial cable is connected properly and the telephone line is working. This is a nice feature and makes troubleshooting easy.

**LABS TESTS** In PC Labs modem testing, the TC-212AD finished respectably in the middle of the pack, performing only a tad poorer than the Hayes Smartmodem 1200 and half as good as the test leaders. At the heart of the TC-212AD is Tek-Com's own proprietary chip set, which provided pleasing, nearly error-free file transfers in my own regular bulletin board transfers.

The TC-212AD has basic Hayes AT compatibility. It auto-dials, redials, and auto-answers well enough to respond to major AT-driven communications packages, though none are included in the purchase price. Unfortunately, it doesn't recognize errors that it probably should. For instance, when I typed in ATJUNK at command mode, instead of returning an error message, it read the AT as an attention command and ignored the rest. Other minor inconsistencies are documented in the Tek-Com manual.

Tek-Com is a little pretentious about some of the TC-212AD's capabilities. For instance, users talking to each other who also have their TC-212ADs connected to the same line can begin communicating once one user sends out a carrier signal by entering ATA and a carriage return at the command line. Tek-Com calls this Voice Assist Communications (VAC), which is just a lot of hooey since this feature is integral to any modem that claims any kind of Hayes compatibility.

The plastic housing looks like (but is a little sturdier than) a case for a video cassette tape and comes in basic black or white. Instead of the eight lights usually on intelligent Hayes-compatible modems, there are only two: one signals the power is on and the other indicates a successful handshake. I consider this a shortcoming: the more blinking lights and whirling widgets on a product, the more fun it is to use.

The manual is thin but well written, so users with no knowledge of communications will feel at home. There are clear illustrations, including talking happy modems to ease any technophobic angst a user may feel.

With its less than sexy name, its boring case, and its general lack of pizzazz, the TC-212AD won't win any high-tech beauty contests. But it did perform adequately, beating out a number of steel-cased hunks, so a key factor to this product's success is its price. Although $229 is not a value to write home about, $199 each for a quantity of ten modems and $159 each for a quantity of 100 are pretty good.

I'd recommend the TC-212AD for volume buyers who need to outfit an entire company or office. I wouldn't discourage single unit buyers from taking a look at the TC-212AD, but I'd suggest they shop around.—**Chris Johnston**

PC MAGAZINE FACT FILE

**Tek-Com Corp.**
120 Charcot Ave.
San Jose, CA 95131
(800) 621-0854
(408) 435-9515

*Volume buyers can take advantage of discounts on Tek-Com's 212AD.*

**Tek-Com-212AD**
**List Price:** $229; in quantities of 10 and 100, $199 and $159, respectively.
**Requires:** Serial port, cable, communications package.
**In Short:** A lightweight, inexpensive, and utilitarian 300/1,200-bps modem.

CIRCLE 464 ON READER SERVICE CARD

## Telenetics Corp.

California-based Telenetics Corp. entered the modem market in 1984 and was one of the first to manufacture an integral 2,400-bit-per-second card for the IBM PC. The company's line now includes both half-size and full-size card modems, and stand-alone models compatible with any computer, plus racks and rack-mounted versions for central and remote applications.

The Telenetics PonyExpress 12 and 24 are small external units. As their model designations indicate, one operates at 1,200 or 300 bps; the other at 2,400 bps. The PonyExpress modems have cases that

are cheap-looking, made of plastic, and have only two indicator lights: modem ready and carrier detect. Both PonyExpress models have only one button on the front panel: a large one labeled Reset. Since it actually disconnects a call, this could be a convenient feature. Also convenient are the three easily accessible configuration switches on the back panel that other modems generally have hidden behind their front panels.

The bad news here is that Telenetics lets you select only carrier detect, data terminal ready, and multiline connections with these switches. There's no hardware switch, for instance, that lets you set auto-answer on or off. Since the default is to have auto-answer on, these modems will pick up any calls you receive, even voice calls—unless you issue the software command ATSO=0 to make them stop.

The 1,200-bps PonyExpress model turned in better-than-average results on PC Labs line-noise resistance tests, while the 2,400-bps model did well at 1,200 bps but only average at 2,400 bps.

The 1,200-bps PonyExpress lists for $345 and may be upgraded to the 2,400-bps version, which has a retail tag of $495. If you have the appropriate software, installing any one of the external Telenetics modems tested consist of little more than plugging it in.

**INTERNAL CARDS** The Telenetics ExpressData 12i/2 is a half-slot internal card. This modem has a circuit board piggybacked on it, making it so thick that when it's installed, there's only 1/16 of an inch to spare on one side between it and any adjacent board.

The volume control worked backward on the model tested; turning it counterclockwise increased the volume.

The ExpressData 12i/2 can be configured to COM1, COM2, COM3, or COM4, as long as your software and hardware will support serial ports with the COM3 and COM4 assignments. The configuration must be done by changing jumpers on the card. The price is $445, which includes software.

The Telenetics ExpressData 24i/2 is an identical half-slot modem that can operate at 2,400-bps, as well as 1,200 and 300, by changing only two chips. The price is $100 more than the Express Data 24i/2.

Unlike the external models, the ExpressData internal modems do not permit changing data terminal ready and carrier detect settings from the outside of the box. Also, the two phone connection plugs are not labeled at all; this shortcoming is at least no worse than the confusing labeling on the ExpressData 24s (reviewed here). In either case, you have a 50 percent chance of making the right connection! If both the sending and receiving modems are Telenetics' products, you can switch between voice and data modes via soft-

## PC MAGAZINE FACT FILE

**Telenetics Corp.**
895 E. Yorba Linda Blvd. Placentia, CA 92670; (714) 524-5770

*There's something for everyone in the Telenetics family of modems, from a budget-conscious half-card modem to a full-featured external modem with 11 LED indicators.*

① **Telenetics ExpressData 12i/2**
**List Price:** $445
**Requires:** Half-length slot
**In Short:** A half-card internal unit that's Hayes compatible and offers adaptive equalization Price includes choice of *Relay* or *Crosstalk* software.
CIRCLE 457 ON READER SERVICE CARD

② **Telenetics PonyExpress 12a**
**List Price:** $345
**Requires:** Serial port.
**In Short:** A budget unit. Inclusion of adaptive equalization makes it stand out from other 1,200-bps modems.
CIRCLE 459 ON READER SERVICE CARD

③ **Telenetics ExpressData 24i/2**
**List Price:** $545
**Requires:** Half-length slot.
**In Short:** A half-card internal modem compatible with Hayes 1200 commands; gives OK response to many Hayes 2400 commands when they're ignored. Price includes choice of *Relay* or *Crosstalk* software.
CIRCLE 456 ON READER SERVICE CARD

④ **Telenetics ExpressData 24s**
**List Price:** $696; with MNP, $795.
**Requires:** Serial port.
**In Short:** A huge external modem with 11 LED indicators and eight switches on front panel. MNP version offers super-fast effective bps rate with proper software. It's worthy of serious consideration if you have the space and money.
CIRCLE 455 ON READER SERVICE CARD

⑤ **Telenetics PonyExpress 24a**
**List Price:** $495
**Requires:** Serial port.
**In Short:** Does the job for those with limited budgets. Small unit with plastic case and only two LED indicators.
CIRCLE 458 ON READER SERVICE CARD

**Borland's Turbo Lightning FREE**

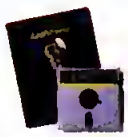
# Here it is...DATADESK'S *TURBO-101 ENHANCED KEYBOARD*

## for the 10 million PC users IBM just ignored!

IBM just announced their new redesigned "standard" keyboerd for personal computers. There's only one problem: *it won't work* on your IBM computar if it was purchesed prior to June 1986 or on *any* PC competible purchesed et any time!

Not to worry. Our new *Turbo-101* Enhenced Keyboerd gives you the leyout end enhencements of the IBM with some logical improvements (see ebove photo). And it works on your existing PC, XT, AT, PCjr, AT&T, Epson end virtuelly ell competibles!

### Get Borland's Turbo Lightning ™ For FREE!



*To really turbocharge your productivity, we are including, free-of-charge, Borland's red-hot Turbo Lightning software with each keyboard.* Now, when using SideKick, WordPerfect, Microsoft Word, 1-2-3 or most populer programs, our Turbo-101 Keyboerd will check your spelling *as you type,* gives you instant access to Rendom House's 80,000-word Concise Dictionery end 60,000-word Theseurus and much, much more!

*"Lightning's good enough to make programmers and users cheer, executives of other software companies weep,"* says Jim Seymour of PC Week. Sold separately, Turbo Lightning retails for $99.95!

### *The Turbo-101 is the best data entry tool since the pencil!*

For users of spreedsheets like 1-2-3, the Turbo-101's *separate* cursor controls and numeric keyped mekes entering numeric dete into cells end moving from cell to cell es neturel es moving your fingers. And for *word-processing,* the *'Selectric'* typewriter leyout makes the Turbo-101 es eesy to use es e pencil; end with the extre lerge Enter, Shift & Control Keys, you'll meke so few mistekes, you won't even need en ereser!

### *SPECIAL OFFER!*

**ONLY $149.95* FOR BOTH KEYBOARD & SOFTWARE**

**Includes 30-day money back guarantee and 2 year full warranty. To prove that we don't ignore you or your pocketbook, you get our Turbo-101 Enhanced Keyboard and Borland's Turbo Lightning for an astounding $149.95.* No, you didn't read it wrong. During this amazing *Introductory Offer* you get both keyboard and software for less than most software programs by themselves! Now, if you're still feeling ignored, you can always do what you-know-who wants you to do...*and buy a new computer to get their keyboard!*

### Up to now, DataDesk International may be one of the best kept secrets, but here's what's being said about our first *end-user* Keyboard/Borland software bundle:

*"Who Cnn Pass Up n Deal? Department. Talk nbout nn nggressive prodnct!"*
*John C. Dvorak, InfoWorld Mar 86*

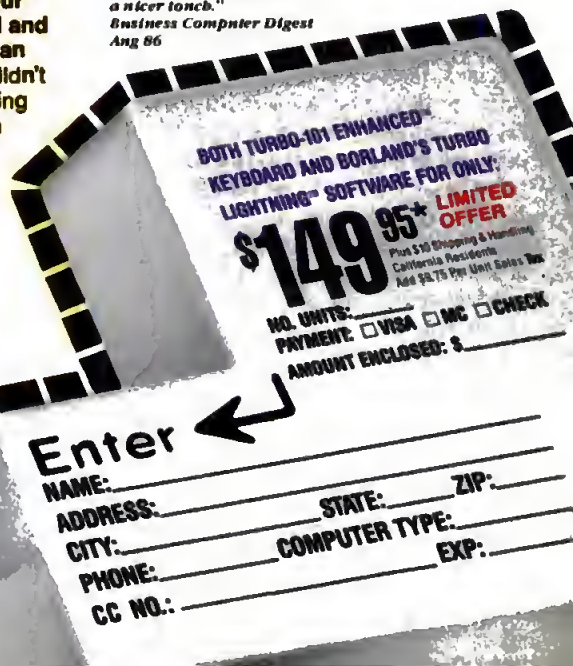
*"It solves all of the problems exhibited by their regnlnr PC/XT keyboard...it's a great bargain!"*
*PC Prodnctivity Digest Mny 86*

*"DataDesk Intl. has designed n stnrdy nnd bnndsnme keyboard that has tactile response...is the bardware bargnin of the yenr" snys Charles Humble, Oregonian Jnn 86*

*"The best part of the keyboard is the way it feels. It's ideal! And fast. I've never worked on a keyboard with a nicer tonch."*
*Business Compnter Digest Ang 86*

*"It's a good keyboard. Good feel: the keys have tnctile feedbacb. No musb nt nti. This is nbont as good n keyboard deat as yon're likely to find...I bave absolntely no bestitation in recommending the Model PC8700."*
*Jerry Pournelle, Byte Magnzine Sept. 86*

*"This keyboard is neat to type on and feels solid. It has tactile feedbncb keys...I cnn type mncb fnster on it."*
*Test Drive Scorecard: DatnDesk 10 Key Tronics-9 Teleconnect Mngazine May 86*




The Only Alternative

**datadesk™**

INTERNATIONAL

7650 Heskell Avenue
Ven Nuys, Californie 91406 (818) 780-1673

*credit card orders call*
***(800) 826-5398***
*in CA call*
*(800) 592-9602*

*Price does not include adaptor cables required by certain compatibles • A Limited offer—price subject to change without notification

MADE IN USA

Turbo-101 is a trademark of DataDesk International. Turbo Lightning is a trademark of Borland International. IBM and IBM AT are registered trademarks of International Business Machines, Inc.

DEALERS CIRCLE 140 ON READER SERVICE CARD
END USERS CIRCLE 141 ON READER SERVICE CARD

ware commands during a single phone call on both the internal and the PonyExpress models.

As with the external products, the internal modems turned in good but not awe-inspiring results in noise resistance tests.

**DELUXE MODEL** The top-of-line ExpressData 24s modem has a special feature—an optional Microcom network protocol (MNP) error correction module that boosts throughput tremendously. The unit tested acheived an 8,000-bps transmission rate when used with Hilgraeve's *HyperACCESS* communications software designed to support MNP.

The ExpressData 24s supports levels 1, 2, and 3 of MNP. For my test the second modem used was Microcom's own model AX/9624c, which costs well over twice as much. The ExpressData 24s handled the protocol as well as the Microcom unit did when they interacted on level 3; however, with its default setting, the 24s gobbles up XON/XOFF characters commonly used for handshaking. This means that there may be operational problems with any software that does not specifically support this modem's MNP feature. The popular *Relay* and *Crosstalk* programs support Telenetics products in general and are bundled with the company's internal modems; the customer may choose between the two programs. However, *Relay* and *Crosstalk* do not seem to offer any specific support for the MNP feature.

The best-known public-domain file transfer protocols, Xmodem and Kermit, are unusually slow when used with the ExpressData 24s or other modems with MNP. This stems from the fact that MNP operates at the highest efficiency when data flows in one direction but at lower efficiency with protocols such as Xmodem and Kermit, which reverse the flow of data at regular intervals in order to acknowledge the receipt of data packets. Protocols specifically designed for use with such modems achieve higher throughput by minimizing the frequency of data flow reversals and, in some cases, by compressing data as well.

For example, I tried transmitting the same *Multiplan* test file with the ExpressData 24s and MNP via Xmodem and achieved an effective bps rate of only 1,500 instead of 8,000. By the way, MNP is an optional plug-in module for the ExpressData 24s; it adds another $100 to the base price of its standard module.

Telenetics sells a standalone MNP module, suitable for use with other brands of modems, priced at $195. As yet the company does not offer MNP on any of its internal modems.

**DESIGN FEATURES** The ExpressData 24s is an appealing unit, with a steel case that's better looking but much larger than those offered with Hayes hardware; in

The footprint of the Telenetics ExpressData 24s is a giant 8 by 11 inches.

fact, the footprint is a giant 8 by 11 inches. The colors of the case match the familiar IBM light and dark gray combination.

The ExpressData 24s has 11 LED indicators compared to the 8 on Hayes products. As you might expect, these lights are all red. Considering the cost of the modem, one could have hoped the manufacturer would have followed the lead of competitors who provide indicator lights on the front panel in a variety of colors, color-coded according to function. Not so. You get 11 identical lights, all in a row.

The three added lights on the 24s are for ring indication, request to send, and clear to send. In addition, the front panel displays eight locking-type switches: pushing them in locks them in that position, and pushing a second time pops them out again. Most of the switches duplicate functions that would normally be accomplished on the unit by software issuing Hayes commands. Some users will find the switches handy, but others will only be confused. These front-panel switches include reset, voice interrupt, speed selection, manual originate, manual answer, auto-answer, digital loop, and a test switch. Unfortunately, the reset switch works like the others, staying in until pressed a second time; this means that, after you press it, your modem won't work until you press it again.

The voice interrupt switch lets you switch between data transmission and voice communication during the same phone call. The default position for the switch is "out," which sets the unit to data transmission. When the transmission is in asynchronous data mode, you can switch instantly to voice contact with the remote operator by pressing the switch in. This action causes both sending and receiving modem speakers to beep approximately ten times, alerting the users to pick up their telephones. If the phones are not picked up within 10 seconds, the connnection is lost.

To return from talking to data transmission, you press the switch a second time, returning it to the out position and causing the word *connect* to reappear on the screen.

Unfortunately, if both modems are not Telenetics' models, your call will be disconnected in any mode the instant you first press the voice interrupt switch.

**ANNOYING ODDITIES** The back panel has labels for telephone jacks that are incorrect, misleading, and in disagreement with the manual. The manual states that the labels read "line" and "phone," which would be reasonable and easy to understand. Actually, the labels say "tel" and "handset." You have to plug the phone line into the plug called tel; if you plug the telephone into the handset jack instead, the modem won't work. Your telephone must be attached to the handset plug.

When the modem is receiving a call, its speaker doesn't issue a ring. That's okay if you have a telephone plugged into the modem; otherwise, you have no suitable indication that a call is being received.

The volume control is recessed into the case and isn't slotted, so you can't even turn it with a screwdriver. The modem has no power switch. To turn it off, you must unplug it from the power source.

These gripes aside, the ExpressData 24s functions well. It achieved good test results at 1,200 bps and acceptable scores

# Blue's Biggest.

Among the many good reasons why IBM is the giant of the microcomputer industry, the AT stands tall. Big on advanced features, the AT is probably the fastest and most sophisticated personal computer on the market. But even bigger is IBM's emphasis on quality workmanship and reputation for service. You can see that in IBM's case, biggest is truly best.

And the best way to get your AT is through Logicsoft. As the world's leading direct distributor of hardware and software, we can configure the AT to your exact requirements. We'll install disk drives, add-on boards, internal modems, etc. from a wide range of name brand manufacturers. And we'll provide 100% burn-in testing, as well as a guarantee, via our free 90 day on-site service contract. In fact, we'll even deliver it overnight. Making purchasing and owning your customized AT easy and convenient. And making Logicsoft the Big Dealer when it comes to Big Blue.

**The Largest Direct Distributor of Software and Hardware Products *...in the World.***

**LOGICSOFT®**

**1-800-645-3491**

(516) 249-8440 • 110 BI-COUNTY BLVD., FARMINGDALE, NY 11735

Logicsoft is a Distributor for Over 250 Leading Manufacturers and Publishers of Computer Products Including: Ashton Tate • AST • Compaq • Epson • Hayes • IBM • Leading Edge • Lotus • Microsoft • Okidata • Quadram • Seagate • Tecmar • Word Perfect

**NEW YORK** 516-249-8440
**SAN FRANCISCO** 415-621-4411 **BOSTON** 617-247-6406
**CHICAGO** 312-372-0939 **BOCA RATON** 305-392-4644
**HOUSTON** 713-227-0201 **EUROPE** 020-83-4864

# Free on-site service an

## IBM AT-30 Mb

• 8 MHz • 512K • 30 Mb IBM Hard Drive (Full Height, w/controller) • 1.2 Mb Half/Height Floppy • Eight Expansion Slots • IBM Enhanced PC Keyboard • Serial/Parallel Adapter • Free 90-Day On-Site Service Contract • Color or Monochrome Monitor Available as Option.
• **Purchase Price: $4,195**

Lease for **$171** per month

## IBM XT 286—20 Mb

• 6 MHz • 80286 Based CPU • Zero Wait States • 640K • 1.2 Mb Half/Height Floppy • 20 Mb Full/Height Hard Drive • Serial/Parallel Adapter • Eight Expansion Slots-(5) 16-Bit, (3) 8-Bit • IBM PC Enhanced Keyboard • Free 90-Day, On-Site Contract • Color or Monochrome Monitor Available as Option.
• **Purchase Price $2,799**

Lease for **$110** per month

## IBM XT-20 Mb

• 512K • 20 Mb IBM Full Height Hard Drive • 360K Floppy Drive Half/Height • Eight Expansion Slots • IBM Enhanced PC Keyboard • Asynchronous Communications Adapter • Free 90-Day, On-Site Service Contract • Color or Monochrome Monitor Available as Option.
• **Purchase Price $2,199**

Lease for **$92** per month

## AT&T 6300

• 640K RAM Memory • One 360K Floppy Drive • Seven Expansion Slots • AT&T Keyboard • High-Resolution Monochrome Graphics Card • High-Resolution Monochrome Graphics Monitor • Serial & Parallel Ports • GW Basic and MS, DOS • Free 90-Day, On-Site Service Contract. Color Monitor Optional.
• **Purchase Price: $1,399**

Lease for **$60** per month

### FREE ON-SITE SERVICE—

With the purchase or lease of most systems you receive 90 days of free service at your facility. Over 96 authorized service centers to serve you throughout the U.S. with an average 4 hour response time.

### LOWEST PRICE COMMITMENT—

Because we are *the* largest direct distributor, our buying power allows us to offer the lowest possible prices on our wide range of products.

### FREE OVERNIGHT DELIVERY—

Buy it today, use it tomorrow on orders totaling over $100. Due to certain restrictions, some bulk items and orders under $100 are shipped UPS FREE (within Cont. U.S.).

## LOGICSOFT CUSTOMER SERVICES

### TOLL-FREE CUSTOMER SERVICE—

On-line computer system allows instant access to customer information. Call 1-800-431-9037.

### LOGICLEASE—

Allows affordable low monthly payments, helps eliminate equipment obsolescence, offers outstanding flexibility plus possible tax benefits. 24 hr. lease approval by phone (on orders over $1000).

### SYSTEM CUSTOMIZATION—

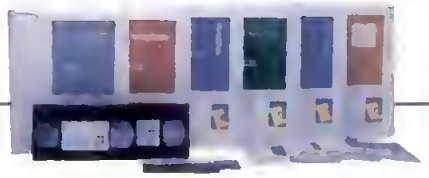
Your system customized to your needs plus Free 48 hour configuretion, testing and burn-in service so your system is ready to run upon delivery.

• No surcharge for MasterCard, VISA, American Express C O D , money order, check or PO's (please call for price verification) • No sales tax on orders shipped outside N Y State • Please add 2% for insurance and handling ($3 00 minimum) (int l orders add !) • We do not bill until we ship All products covered by mfg's warranty Defective merchandise may be returned for repair or exchange only We do not guarantee compatibility Any goods returned for credit are subject to a 10% restocking charge All prices and policies subject to change without notice

NEW!

Increase your productivity and expand your knowledge quickly and easily with state-of-the-art

# TRAINING VIDEO CASSETTES AND DISKS



One person or an entire staff can work smarter, better, and faster using these effective interactive, hands-on training programs right at your PC. Novice, intermediate and experienced users of business software can profit by learning to use the most popular software quickly and with measurable results.

**MICRO VIDEO Learning Systems**

are guaranteed because they're designed with companies like Ashton-Tate and Microsoft. Over 50% of the Fortune 2,000 are using these Learning Systems today. VHS or Beta.

| | RETAIL | LOGICSOFT |
|---|---|---|
| dBASE III Plus | $495 | $359 |
| IBM PC Primer | $295 | $259 |
| The 1-2-3 Learning System Release (2.0) | $495 | $359 |
| Running MS DOS | $495 | $359 |
| Multimate Advantage | $495 | $359 |
| Symphony | $495 | $359 |

*When purchased with corresponding product* **SAVE $20**

**Cdex - Intelligence SUDDEN KNOWLEDGE *On Disk* Training Programs.**

New Co-Residency Feature™ allows switching between training program and application program. You can immediately practice skills acquired in the training program through actual application program use.

| | RETAIL | LOGICSOFT |
|---|---|---|
| Advanced Lotus 1-2-3 | $124.95 | $89 |
| Analyzing Financial Statements with Lotus 1-2-3 | $149.95 | $109 |
| Analyzing Sales Performance with Lotus 1-2-3 | $149.95 | $109 |
| Building a Business Plan with Lotus 1-2-3 | $149.95 | $109 |
| dBASE III Plus | $124.95 | $89 |
| IBM PC/AT | $124.95 | $89 |
| IBM PC/XT | $124.95 | $89 |
| Lotus 1-2-3 | $99.95 | $75 |
| Managing Your Business with Lotus 1-2-3 | $149.95 | $109 |
| Multiplan | $99.95 | $75 |
| Symphony | $124.95 | $89 |
| Word Perfect | $124.95 | $89 |
| Wordstar | $124.95 | $89 |

*When purchased with corresponding product* **SAVE $5**

# Free overnight delivery on software for all your IBM PC applications!

**WORD PROCESSING**

| | |
|---|---|
| Display Write IV | $339 |
| Lotus Manuscript | 349 |
| Microsoft Word 3 | 279 |
| Multimate | 239 |
| Multimate Advantage | 299 |
| Office Writer | 259 |
| PFS Professional Write | 115 |
| Volkswriter 3 | 147 |
| Word Perfect | 209 |
| Wordstar | 179 |
| Wordstar Pro Pak | 239 |
| Wordstar 2000 | 245 |
| Wordstar 2000 Plus | 289 |
| XY Write III | 219 |

**WORD PROCESSING ADD-DNS**

| | |
|---|---|
| Fancy Font (FX) | $139 |
| Punctuation & Style | 85 |
| Turbo Lightning | 59 |
| Word Finder | 55 |
| Word Perfect Library | 69 |

**DATABASE MGMT.**

| | |
|---|---|
| Cornerstone | $ 69 |
| d Base III Plus | 419 |
| d Base III Lan Pak | 619 |
| Foxbase Plus | 249 |
| Knowledgeman/2 | 309 |
| PFS Professional File | 145 |
| Paradox | 449 |
| Powerbase | 185 |
| Q & A | 245 |
| R: Base 5000 | 265 |
| R: Base System V | 359 |
| Reflex | 95 |
| Revelation | 519 |

**DATABASE MGMT. ADD-ONS**

| | |
|---|---|
| Clipper | $349 |
| Ext. Report Writer | 179 |
| Genifer | 225 |
| Quickcode III | 149 |
| Quick Report | 145 |
| Quicksilver | 379 |

**SPREADSHEET/ INTEGRATED**

| | |
|---|---|
| Ability | $ 69 |
| Boeing Calc | 309 |
| Enable | 349 |
| Framework II | 419 |
| Lotus 1-2-3 | 329 |
| Microsoft Multiplan | 119 |
| PFS First Choice | 95 |
| Smart Integrated | 459 |
| Supercalc IV (NEW) | 285 |
| Symphony | 459 |

**SPREADSHEET ADD-ONS**

| | |
|---|---|
| HAL | $109 |
| Lotus Report Writer | 99 |
| Quickcode for 1-2-3 | 85 |
| Sideways | 45 |
| Smart Notes | 49 |
| Spreadsheet Auditor | 95 |
| SQZ | 59 |

**DESKTOP PUBLISHING**

| | |
|---|---|
| Click Art Personal Publisher | $105 |
| Harvard Pro Pub. | 445 |
| Page Maker | Low Price Call! |
| Ventura | 659 |

**GRAPHICS**

| | |
|---|---|
| Chartmaster | $215 |
| Diagram Master | 195 |
| Energraphics (NEW) | 309 |
| Freelance Plus | 349 |
| Harvard Presentation | 249 |
| Map Master | 229 |
| Microsoft Chart | 179 |
| Sign Master | 149 |

**CAD/CAM**

| | |
|---|---|
| Auto CAD 2.52 | $2,399 |
| Auto CAD Basic | 247 |
| Drafix 1 | 219 |
| Generic CAD | 79 |
| Pro Design II | 179 |

**LANGUAGES**

| | |
|---|---|
| BASIC Compiler (MS) | $255 |
| C Compiler (MS) (4.0) | 279 |
| COBOL Compiler (MS) | 425 |
| FORTRAN Compiler (MS) | 279 |
| Lattice C Compiler | 249 |
| Macro Assembler (MS) | 97 |
| Pascal Compiler (MS) | 183 |
| Quick Basic (MS) | 67 |
| True Basic | 109 |
| Turbo C | 75 |
| Turbo Basic | 75 |
| Turbo Pascal (plus BCD & 8087) | 65 |

**PROJECT MANAGEMENT**

| | |
|---|---|
| Harvard Total 2 | Low Price Call! |
| Microsoft Project | $239 |
| Super Project Plus | 305 |
| Timeline | 235 |

**FINANCIAL**

| | |
|---|---|
| Managing Your Money | $115 |
| Dollars N' Sense | 107 |

**ACCOUNTING**

| | |
|---|---|
| BPI Entry | $189 |
| Computer Associates | Low Price Call! |
| Great Plains | 449 |
| Open Systems (3.0) | 419 |

**MISC/UTILITIES**

| | |
|---|---|
| Carbon Copy | $139 |
| Concurrent PC DOS | 169 |
| Copy II PC | 35 |
| Crosstalk XVI | 99 |
| Dan Bricklin's Demo | 65 |
| Disk Optimizer | 35 |
| Fastback | 95 |
| Microsoft Windows | 67 |
| Norton Commander | 49 |
| Norton Utilities | 55 |
| PC DOS 3.2 | 85 |
| Remote | 149 |
| Sidekick | 55 |
| Smart Com II | 89 |
| Superkey | 45 |
| Traveling Sidekick | 49 |
| XTREE | 39 |

## 2 NEW FREE CATALOGS. CALL TODAY! 1-800-645-3491

- Brand new **Programmer's Language and Utilities Guide** • A convenient and valuable listing of timesaving tools for the programming professional • Complete with product description.
- Brand new **Productivity Guide** • Full line catalog of software enhancements for the business professional • Full descriptions of templates, memory management, menu management, backup software, training, and much more.

**Circle #400 on reader service card.**

# The Nation's l
# and fr

## 5 YEAR WARRANTY

Look for the items printed in red to identify Logicsoft's own line of computer hardware products. They are fully compatible with, but priced well below, the major manufacturers. You save—not by our use of inexpensive labor and parts—but through state-of-the-art technology.
**Each product carries our 5 year unconditional replace or repair warranty.**

## SPECIAL

### *NEW* ISOBAR® WITH REMOTE POWER SWITCH AND MODEM PROTECTOR

The most electronically advanced surge suppressor you can buy. Exclusive multiple filters (up to 21 in IB 8-15) protect equipment and data against transient voltage spikes and AC line noise. Isolation feature even guards against equipment interaction between duplex receptacles.

"Cascade Circuitry" design lets you choose the level of protection you need, offering more protection for your more sensitive equipment.

For the most complete spike & noise protection, order the ISOBAR®.

with Remote **$69**
without Remote **$65**

**PRINTERS***

Diconix 150 (for laptops) . . . $369
**EPSON**
EX 800 . . . . . **Low Price Call!**
EX 1000 . . . . . **Low Price Call!**
FX-86E . . . . . **Low Price Call!**

FX-286E . . . . . **Low Price Call!**
LQ 800 . . . . . **Low Price Call!**
LQ 1000 . . . . . **Low Price Call!**
LQ 2500 . . . . . **Low Price Call!**
**NEC**
Pinwriter P-5 Series
. . . . . **Low Price Call!**
Pinwriter P-6 . . . . . $489
Pinwriter P-7 . . . . . 669
P6 Color Printer . . . . . 599
P7 Color Printer . . . . . 799
**OKIDATA**
182 Plug & Play . . . . . 267
192 Plus (IBM) . . . . . 379
193 Plus (IBM) . . . . . 558
290 Series . . . . . **Low Price Call!**
2410P Plug & Play . . . . . 1759
**PANASONIC**
KX 1080 i . . . . . 219
KX 1091 i . . . . . 299
KX 1595 . . . . . 549
**TOSHIBA**
P/S 321 (IBM) . . . . . 489
P 341 . . . . . 695
P/S 351 (IBM) . . . . . 999
351 Color Printer . . . . . 1315
**CITIZEN**
MSP 10 . . . . . 299
MSP 15 . . . . . 399
MSP 20 . . . . . 339
MSP 25 . . . . . 499
Premier 35 . . . . . 509

**PRINTER BUFFERS**

**QUADRAM**
Microfazer Series
. . . . . **Low Price Call!**

**LASER PRINTER***

**CANON**
Laser Printer LBP8A1 . . . . $1949
Laser Printer LBP8A2 . . . . . 3089
**HEWLETT PACKARD**
Laser Jet . . . . . 2399
Laser Jet Plus . . . . . 3199
Laser Jet 500 . . . . . 4299
Series 2 . . . . . **Low Price Call!**

**PLOTTERS***

**HEWLETT PACKARD**
7475A . . . . . $1629
7550 . . . . . 3275
**HOUSTON INSTRUMENTS**
DMP 40 . . . . . 855
DMP 41 . . . . . 2599
DMP 42 . . . . . 2599
DMP 51 . . . . . 3789
DMP 52 . . . . . 3789
DMP 52 MP . . . . . 4259

**MONITORS***

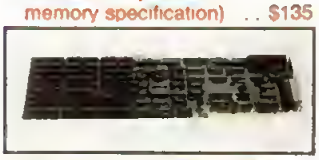
**AMDEK**
Color 600 RGB . . . . . $409
Color 722 (EGA Comp.) . . . . . 499
Color 725 . . . . . 559
12" Amber 310A . . . . . 149
**IBM**
Color Monitor . . . . . 545
Monochrome Monitor . . . . . 225
Enhanced Color Display . . . . 649
**LOGIC**
Super High Res. . . . . 495
Monochrome 12' . . . . . 99
**NEC**

Multi-sync color
w/swivel base . . . . . $599
**PRINCETON GRAPHICS**
LM 300 . . . . . 559
RGB HX-12 (690x240) . . . . . 449
RGB HX-12E (EGA Comp.) . . 535
RGB SR-12 . . . . . 569
Amber Max 12 . . . . . 165
**QUADRAM**
Amberchrome 12" . . . . . 145
Enhanced Graphics
Monitor w/swivel . . . . . 479
**TAXAN**
660 12" EGA . . . . . 525
720 14" CGA . . . . . 399
118 12" Green . . . . . 109

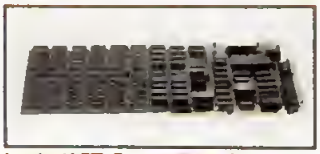
**MULTI-FUNCTION BOARDS**

**AST RESEARCH**
Six Pack Premium . . . . . $199
Six Pack Plus (384K) . . . . . 219
Rampage w/256K . . . . . 275
Rampage (AT) w/512K . . . . . 349
Advantage (128K) . . . . . 369
I/O Mini Half Card . . . . . 119
I/O Plus II . . . . . 125
**COMPUTER PERIPHERALS**
Overachiever 512K . . . . . 349
LOGICSOFT

Logic Board (Lotus/Intel/
Microsoft Expanded
memory specification) . . $135



Logic (AST Compatible) Multi-
function Board w/0K . . . . 105
w/384K . . . . . 155



Logic (AST Compatible) AT
Multifunction Board w/128K
(Expandable to 2.0 Mb) . . . 209

Circle #400 on reader service card.

Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
   1. Front side touching the free page
   2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet




GbsSlipSheet-001

Folded edge of the page

Inverted Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
   1. Front side touching the free page
   2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

1. Follow Instructions on the other side

Inverted Back

GbsSlipBack-001B

Back

1. Follow Instructions on the other side

# d overnight delivery

## ompaq Deskpro
## 86-40 Mb

16, 8 & 4 HMz Clock Speeds • 1 Mb AM Memory • 80386 Based CPU • One 0 Mb Hard Drive (w/controller) • One 2 Mb Half/Height Floppy Drive • 6 Expansion Slots • Compaq 101 Key nhanced Keyboard • One Serial One arallel • Color or Monochrome Available Option.
**Purchase Price: $5,349**

ease for **$203** per month

## Compaq Deskpro 286—40 Mb

• 640K RAM Memory • 80286 Based CPU • One 40 Mb Hard Drive (w/controller) • One 1.2 Mb Half/Height Floppy Drive • Seven Expansion Slots • Compaq Keyboard • Graphics Card • One Parallel Port • Free 90-Day, On-Site Service Contract • Color or Monochrome Available as Option.
• **Purchase Price: $3,999**

Lease for **$158** per month

## Blue Chip / by Hyundai IBM PC / XT Compatible

• 512K RAM Memory • 4.77 MHz • One 360K Half/Height Floppy Drive • Six Expansion Slots • Low Profile Keyboard • Serial/Parallel Ports • 130 Watt Power Supply • High Resolution Monochrome Display Card Standard.
• **Purchase Price: $579**

## Blue Chip Options:

| | | | |
|---|---|---|---|
| MS DOS & GW Basic | $79.00 | Additional 360K Half/ Height Floppy Drive | $99.00 |
| Blue Chip Amber Monochrome Monitor | $85.00 | 10 Mb Hard Drive Option | $365.00 |
| Blue Chip Green Monochrome Monitor | $75.00 | 20 Mb Hard Drive Option | $409.00 |

## 100% Burn-In and Testing

All systems undergo a 48-hour configuration, testing and burn-in period. We configure system boards, set DIP switches, format hard drives, perform memory diagnostics and check system with monitor.

## T XTRA XP
## /20 Mb

M XT Compatible with speed of an AT 12K of RAM Memory (Expandable to 0K on Mother Board) • 80286 Based U running at 6 MHz • One 20 Mb Hard ve • One 360K Floppy Drive • 5 pansion Slots • ITT Keyboard • One rial Port • One Parallel Port • Color or nochrome Monitor Available as Option.
**Purchase Price: $1,999**

ase for **$84** per month

## Zenith Z-181 Laptop (Dual Floppy)

• 640K RAM Memory • CMOS 8088 Running at 4.77 MHz • Two 720K 3.5" Floppy Drives • Supertwisted Backlit LCD Screen • RGB/Monochrome Composite Card • One Parallel and Serial Port • Clock Calendar • External Floppy Drives Optional.
• **Purchase Price: $1,799**

Lease for **$76** per month

## *NEW!* Toshiba Laptop T-1100 Plus (Dual Floppy)

• 640K RAM Memory • CMOS 80C86 Running at 7.1 MHz • Two 720K 3.5" Floppy Drives • One Expansion Slot • TOSHIBA Keyboard • NEW Supertwist • LCD Display • Color Graphics/ Monochrome Composite Card • One Parallel and Serial Port • Clock Calendar • External Floppy Drives Optional.
• **Purchase Price: $1,599**

Lease for **$69** per month

## Toshiba 3100 Laptop

• AT Power in a Compact Size • 640K RAM Memory • Intel 80286 Running at 8MHz • One 3.5 720K Floppy Drive • One 10 Mb Hard Drive • Gas Plasma Screen • Color/ Graphics/Monochrome Composite Card • Parallel Port • 81 Key Keyboard.
• **Purchase Price: $3,299**

Lease for **$130** per month

# LOGICSOFT®

110 Bi-County Blvd., Dept. 54321
Farmingdale, NY 11735

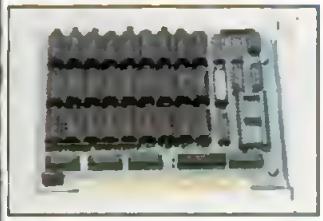
To order, call our National Hotline:
**1-800-645-3491**

For Orders or Technical Assistance, call: (516) 249-8440

ew York • 516-249-8440 San Francisco • 415-621-4411 Boston • 617-247-6406 Chicago • 312-372-0939 Boca Raton • 305-392-4644 Houston • 713-227-0201 Europe • 202-83 48 64

# argest selection of peripherals
# ee overnight delivery!

Logic (AST Compatible)
576K Ram Board ½ Card



w/0K . . . . . 39
w/384K . . . . . 119
w/576K . . . . . 145
Logic (AST Comp.) I/O
Mini Half Card . . . . . 105
**QUADRAM**
Quadboard (384K) . . . . . 169
Silverboard . . . . . 175
Liberty (AT) 128K
(6-8 MHz) . . . . . 315
**INTEL**
Above Board (PS/AT)
w/128K . . . . . 459
(PC) w/64K . . . . . 249
(AT) w/128K . . . . . 425
(PS) 64K . . . . . 289
(PS) 256K . . . . . 389
8087-2 Math
Co-Processor . . . . . 169
8087-3 Math
Co-Processor . . . . . 125
80287 Math
Co-Processor . . . . . 199

## TURBO CARDS

**INTEL**
Inboard 386/AT . . . . . $1249
**MAYNARD**
Surprise . . . . . $219
**ORCHID**
Jet 386 . . . . . Low Price Call!
Tiny Turbo . . . . . 429
Turbo EGA . . . . . 575
**WAVEMATE**
Bullet 286 . . . . . Low Price Call!

## GRAPHICS BOARDS

**AST**
Preview . . . . . $239
Six Pack Premium/EGA
Series . . . . . Low Price Call!
**ORCHID**
Turbo EGA . . . . . 569
**HERCULES**
Monochrome
Graphics Card . . . . . 199
Color Card . . . . . 155
Graphics Card Plus . . . . . 195
**LOGICSOFT**
Logic (Hercules Comp.)
Color Graphics Board . . 89

Logic (IBM (Comp.) Enhanced
Graphics Adapter (EGA) . . . 255

Logic (Hercules Comp.)
Monographics Board . . . . . 89
**PARADISE SYSTEMS**
Auto Switch EGA Card . . . . . 369
Modular Graphics Card . . . . . 199
Color/Mono . . . . . 99
**PRINCETON**
LM 300 A Driver Card . . . . . 559
**QUADRAM**
EGA Plus Graphics . . . . . 339
Pro Sync EGA . . . . . 375
**VIDEO 7**
VEGA (½ Card) . . . . . 319
VEGA Deluxe (½ Card) . . . . . 369
**TECMAR**
Graphics Master . . . . . 475
EGA Master . . . . . 275

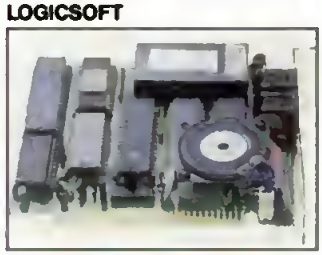
## COMMUNICATIONS BOARDS

**AST**
5251-11 Plus . . . . . $655
5251-11 . . . . . 609
**DCA**
IRMA Board . . . . . 769

## MODEMS

**EVEREX**
Evercom II . . . . . $125
**HAYES**
Smartmodem 1200 . . . . . 389
Smartmodem 1200B
w/Smartcom II . . . . . 359

Smartmodem 2400 . . . . . 599
Smartmodem 2400B
w/Smartcom II . . . . . 559
**LOGICSOFT**



Logic (Hayes Comp.) 1200B
Internal Modem with Mirror
(Crosstalk Clone) Software . 135
Logic (Hayes Comp.) 1200
Baud External Modem . . . . 179
Logic (Hayes Comp.) 2400
Baud External Modem . . . . 309
Logic 2400B Internal Modem
2400B w/Software . 299
**PROMETHEUS**
Pro-modem 1200 . . . . . 289
Pro-modem 1200B . . . . . 145
**TOSHIBA**
1200B Laptop Modem
(T1100 Plus) . . . . . 329

## MOUSE INPUT DEVICES

**MOUSE SYSTEMS**
PC Mouse w/DR Halo 2 . . . $119
**MICROSOFT**
Microsoft Mouse (Serial) . . . . 135
Microsoft Mouse (Buss) . . . . . 125

## SURGE PROTECTORS

**TRIPPLITE**
Isobar . . . . . $55
Isobar RM . . . . . 59
**KENSINGTON MICROWARE**

Masterpiece Plus . . . . . 119
**LOGIC**
Spike Bar . . . . . 39
Spike Block . . . . . 29
**CURTIS**
Diamond . . . . . 36
Ruby . . . . . 59
**NETWORK**
Power Mouse . . . . . 115

## KEYBOARDS

**KEYTRONIC**
5151 (Deluxe) . . . . . $169
5151 (AT&T) . . . . . 189
**LOGIC**
Enhanced Keyboard . . . . . 99

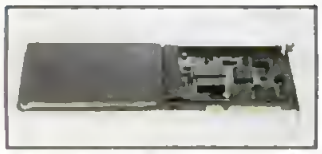
## MEMORY STORAGE

**IOMEGA**
Bernoulli Box (10 + 10) . . . $1999

Bernoulli Box (20 Mb) . . . . . 1799
Bernoulli Box (20 + 20) . . . . 2499
Bernoulli Box Plus . . . . . 4199

## HARD DISK DRIVES

**MOUNTAIN COMPUTER**
Hard Drive Card (20 Mb)
or (30 Mb) . . . . Low Price Call!
**PRIAM CORP.**
60 Mb Internal Hard Drive . $1389
Innerspace ID 40 Mb . . . . . 1349
**PLUS**



Hard Card 20 Mb . . . . . 675
**SEAGATE**
10 Mb ½ Ht Int . . . . . 365
20 Mb ½ Ht Int . . . . . 409
30 Mb ½ Ht Int . . . . . 479
20 Mb Full Ht (AT) . . . . . 569
30 Mb Full Ht (AT) . . . . . 619
40 Mb Full Ht (AT) . . . . . 739
80 Mb Full Ht (AT) . . . . . 1175

## CARTRIDGE TAPE BACK-UP

**IRWIN**
Irwin 110 10 Mb Int . . . . . $359
20 Mb Int . . . . . 489
20 Mb 325 (AT) Ext. D . . . . . 595
**SYSGEN**
Image Tape Backup
10 Mb Int . . . . . 789
Image Tape Backup
20 Mb Int . . . . . 599
Image Tape Backup
20 Mb Ext . . . . . 649
**TECMAR**
QIC 60 AT (Int) . . . . . 1239
QIC 60 Ext Tape Backup . . . 1579
QIC 60 Host Adapter Card . . . 125

## FLOPPY DISK DRIVES

Panasonic 360 K ½ Ht . . . . $115
Tandon TM-100 360 K F/Ht . 115
Tandon TM-100 360 K ½ Ht . 105
Toshiba 360 K½ Ht . . . . . 109
Toshiba Ext. 5.25 360 Drive . . 379

## BACK UP POWER SUPPLIES

**DATA SHIELD**
200 Wt (PC) . . . . . $259
300 Wt (XT) . . . . . 369

500 Wt (AT) . . . . . 579
800 Wt (AT) . . . . . 629
**LOGIC**
325 WT . . . . . 305
450 WT . . . . . 385
675 WT . . . . . 549
1000 WT . . . . . 819

*Due to weight restrictions, Printers and Monitors and some misc. bulk items are shipped UPS—free. All prices and policies subject to change without notice.

at 2,400 bps on the PC Labs benchmark tests.

Telenetics manuals are very technical. First-time users will find them unfriendly. The documentation for the ExpressData 24s is hard to read and was apparently printed by photographically reducing the output from a daisy wheel printer.

**AUTOMATIC ADJUSTMENT** All of the Telenetics modems I tested incorporate remotely activated loopbacks, permitting full remote diagnostics through a toll-free number. They also have adaptive equalization, which means the units adjust automatically to varying line conditions for more dependable data transfer. They use Rockwell's advanced integrated-circuit chip design for this feature, which is included even on the Tenetics' 1,200-bps units. Very few competitive modems operating at this speed offer any kind of adaptive equalization.

The 1,200-bps modems meet Bell 212A and 103 standards; to these the 2,400-bps units add conformation to CCITT V.22 bis standards.

All of the items in the Telenetics line that were checked out do support the Hayes 1200 command set. However, they only "pretend" to support some of the Hayes 2400 commands—specifically, those that begin with the "&" prefix. Moreover, if the command is entered with the proper terminology, no error message is issued; you'll get OK displayed on your screen even if the command has been ignored. Presumably, this response has been furnished so that the modems will continue to work even if a communications program treats them as some other kind of modem.

Transformers are included with Telenetics external models, but they have only two-pronged AC plugs.

All the Telenetics models display a busy message if a number has been dialed that is in use—a welcome feature. Many of their competitors don't, including the original Hayes 1200 product and a number of compatibles.

The bottom line is that the Telenetics modems are good performers. If you're looking for a 1,200-bps unit, you may want to give the company's products special consideration because of the adaptive equalization; you're likely to see fewer squiggly brackets on your screen. If you can afford a 2,400-bps MNP model and have software that will support that protocol, you can transmit error-free at speeds that may return your investment in savings on phone bills.—**Marvin Bryan**

## Thompson, Harriman and Edwards Computer Products Ltd.

You might think that these are generic modems—they look the part, labeled boldly as THE 1200 Com Modem and THE 2400 Com Modem. But THE is no mere definite article. It stands for Thompson, Harriman and Edwards Computer Products, a company that, since April 1986, has earned fame as the first to make a PC compatible selling for under $500 (or so it claims).

The prices of the THE external modems look just as attractive as that of the THE budget system—with a retail tag of $128.42 for a Hayes-compatible 1,200-bit-per-second unit and $279.72 for 2,400 bps. To add even more value, THE includes *PC-Talk III* communications software with both products.

There's a catch: those appealing prices apply only for members of the PC Network wholesale buying club, although the products are available through the THE dealer network for somewhat more.

The connection with PC Network is more than incidental—the owners of the $90 million wholesale club also own the THE company. THE was organized in April 1986 to serve as the manufacturing arm of PC Network.

Although THE makes PC clones in Chicago, the THE modems are made on the windy island of Formosa and are tagged with tiny stickers attesting to their origin in Taiwan. According to THE, the modems are made there under the auspices of the better-known U.S. Robotics.

Notwithstanding (or because of) that heritage, the THE modems rank as more than mere Hayes knockoffs. Certainly the controls, features, commands, and even styling of the THE modem pair are nearly a perfect match for those of official Hayes products. The only feature not copied appears to be the color—the THE cases are stamped and painted steel instead of the Hayes choice of extruded aluminum. But take the THE modems apart, and you'll see that these are top-quality products in their own right. Both THE modems are designed and manufactured to a very high standard, equal to any modem on the mar-

PC MAGAZINE FACT FILE

**Thompson, Harriman and Edwards Computer Products Ltd**
319 W. Ontario St
Chicago, IL 60610
(312) 642-9626

*The THE modems do not sacrifice quality to their low prices.*

① **THE 1200 Com Modem**
**List Price:** $128.42
**Requires:** Serial port.
**In Short:** A Taiwan-made 300/1,200-bps external modem that's a functional and near-perfect Hayes clone and that includes *PC-Talk III* software.
CIRCLE **633** ON READER SERVICE CARD

② **THE 2400 Com Modem**
**List Price:** $279.72
**Requires:** Serial port.
**In Short:** A Taiwan-made 300/1,200/2,400-bps external modem that's a functional and near-perfect Hayes clone and that includes *PC-Talk III* software.
CIRCLE **632** ON READER SERVICE CARD

ketplace and even better than most.

The THE modems bear an intrafamily resemblance also shared by the Hayes products. Both are external modems relying on small black wall-mounted transformer bricks for a supply of low voltage. With minor exceptions, the two THE products are identical—beige case with black plastic end panels.

The front panels are equipped with a row of LEDs that duplicate the function of those on the Hayes, including the same two-letter abbreviations for High Speed, Auto Answer, Carrier Detect, Off Hook, Receive Data, Send Data, Terminal Ready, and Modem Ready indications. At the rear of each, you'll find a nonlocking power jack, a female DB-25 connector for serial digital input, and a small toggle switch to turn the power on and off.

The high-speed model features two modular telephone jacks, plainly labeled for line and telephone connections. (A telephone need not be plugged into the latter for the modem to work.) The 1,200-bps modem has but a single modular telephone connector with a volume control for the internal speaker occupying the place of the other modular jack.

Both THE modems are built on single printed-circuit boards that occupy the full length and width of the case. All connectors, indicators, and switches are directly soldered to this board. Both THE modems have a non-user-serviceable power protection fuse inside, soldered to the main circuit board.

**DISSIMILAR CIRCUITRY** As alike as they look on the outside, the circuitry of the two is quite dissimilar, however. The THE 1,200-bps product relies on a mixture of discrete components and VLSI chips, favoring the former. The 2,400-bps modem is built around the Rockwell chip set with very little discrete support.

As with the Hayes original, the THE 1,200-bps modem has a single bank of DIP switches to configure its operating parameters. The THE modem duplicates the Hayes functions exactly—you even have to pry off the front panel to get at the switches—so that instructions that specify Hayes will work for the THE precisely.

As with the high-speed Hayes, the THE 2,400-bps modem has no DIP switches but is configured by software, the configuration being retained even after the power is shut off. Even the volume of the internal, bottom-firing speaker is software controlled.

The THE 1,200-bps modem operates asynchronously at either 300 or 1,200 bps, per the Bell 103 and 212A standards, respectively. Auto-answering, auto-dialing (tone and pulse), and auto-redialing are all standard, and the modem is fully compatible with the Hayes 1,200-bps extended command set. Both modems performed slightly better than their Hayes equivalents in line-noise resistance tests.

To that foundation of features, the THE 2,400-bps product adds the ability to synchronously or asynchronously communicate at 2,400 bps under the v.22 bis standard. In addition, its result code compatibility is extended through level 10.

If the name is not important to you—or, alternatively, if the THE name is—the THE modems offer a lower-priced alternative to the Hayes products with no apparent sacrifice in quality.—**Winn L. Rosch**

## Transend Corp.

Psst! Wanna buy some modems, cheap? Have I got a deal for you! These modems are from Transend Corp., a company whose primary business is not hardware but communications software. It developed the *Transend* package for Apple in the late 1970s and *PC COMplete* in the early 1980s. *PC COMplete* is being used by General Electric Information Services as *PC Mailbox* and by AT&T Information Services as *Access II/6300*. The company markets its modems, the Transend PCM1200, an internal half card, and the Transend PCM 2400, an internal full card, as a bundling option to its software (buy a modem and get *PC COMplete* for $119).

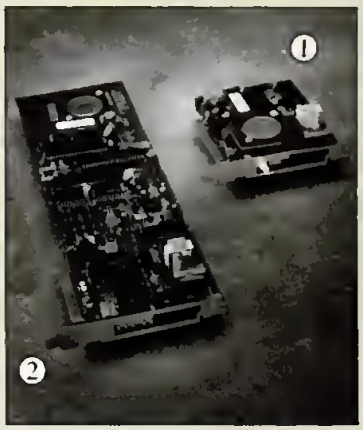
Neither modem is made by Transend but by U.S. Robotics. Transend offers a 2-year labor (but not parts) warranty on both models. Both are simple to set up, and in tests conducted by PC Labs to measure resistance to line noise during data transfers, the PCM1200 showed acceptable results and the PCM2400 showed quite good results.

The PCM1200 installs easily into any available short slot. It is a single card with a wafer-thin speaker bolted to it. Configured at the factory for COM1, the PCM1200 uses a pin-and-jumper combination to change to COM2. Protruding from the back are a volume-control dial and two unmarked RJ-11 jacks (the top for the line, the bottom for a phone). There are only four DIP switches that can be set, and they, too, are accessible from the rear.

All of the S registers are software controlled. Completely Hayes compatible, this minute modem will auto-dial, auto-answer, and respond with either terse or verbose responses. It operates from 0 to 300

### PC MAGAZINE FACT FILE

**Transend Corp.**
884 Portola Rd.
Portola Valley, CA 94025
(415) 851-3402



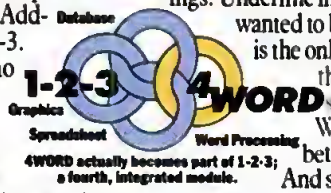

*Transend's bargain-priced modems performed admirably in testing.*

① **Transend PCM1200**
**List Price:** $159; with *PC COMplete*, $278.
**Requires:** Short slot.
**In Short:** An inexpensive Hayes-compatible half card with few features but adequate performance.
CIRCLE 681 ON READER SERVICE CARD

② **Transend PCM2400**
**List Price:** $289; with *PC COMplete*, $408.
**Requires:** Full slot.
**In Short:** A bargain-priced Hayes-compatible 2,400-bps internal modem that shows strong resistance to line noise.
CIRCLE 680 ON READER SERVICE CARD

# Attention Lotus users: Write easier, write faster. Right in 1-2-3.

Lotus users must be the most loyal, most patient people in the world . . . so many of you continue to use 1-2-3 for writing memos and reports. You tap the / Range Justify command to rearrange text. Your [F2] edit key is worn an eighth of an inch shorter than the rest. It's not pretty, but it works. Well, your patience just paid off. Introducing 4WORD, The Add-In Word Processor™ for 1-2-3. If you've ever written a memo using Lotus, you're going to love it.




### Complete Word Processing. Built-In.

4WORD is unlike anything you've seen. It's not a macro. It's not even a stand-alone Lotus add-on. 4WORD is full-featured word processing software that integrates into 1-2-3 itself. It's one of the first products available that uses the new advanced Add-In technology from Lotus. So it actually functions as part of 1-2-3. That means when you want to write a memo, just shift into 4WORD with a single keystroke. Right in the middle of your spreadsheet. You never have to stop, store and exit 1-2-3 again.

Developed by LeBlond Software
The Add-In Experts

Imagine: You're running a "what-if" budget analysis in 1-2-3 and you come up with a better solution. Quick, fire off a memo to your department manager before you lose your train of thought. Without 4WORD you'd have to save your spreadsheet, exit 1-2-3 and load a word processor. With 4WORD, just move the cursor to an unused column, press a key and you're there. Now you can type away. With features of the most powerful word processors.

### Prettier Spreadsheets. Instantly.

Use bold printing to make spreadsheet titles stand out. Italicize your column headings. Underline in places you've always wanted to but couldn't. 4WORD is the only add-in word processor that can dress up your spreadsheets themselves. Which means they look better and more professional. And so do you.

4WORD gives you automatic word wrap with on-screen justification. Block copy and move. Bold, italics, underline, global search and replace, tabs, automatic re-align, margins, and more. All right on your screen. All without leaving 1-2-3. You can even create sophisticated form letters, and merge them with the spreadsheet's database. Automatically. Then print with the 1-2-3 /Print command. And, the whole process can be controlled by a 1-2-3 macro.

*Specifications:*

- Not copy-protected
- Requires PC/MS-DOS 2.0 or later and an IBM PC version of Lotus 1-2-3 Release 2.0 or 2.01.
- Compatible with EMS boards and programs like Sidekick, SQZ!™ Note-It® and HAL.
- Uses <60K of additional memory.
- Complete on-line help system
- Can be controlled by 1-2-3 macros.

Now let's talk integration. Imagine the memo again. And imagine this: To demonstrate your solution, you need to include spreadsheet numbers. Can 4WORD do that? You bet. Just tap Integrate (that's a new 4WORD command), move the cursor across the range of numbers and zap. Your memo is connected to your spreadsheet. And the numbers appear in the memo right where you want them. If you change numbers in the spreadsheet, the memo changes too. We call this "hot links." And the first time you write a report with tables, exhibits and appendices linked to 1-2-3 spreadsheets, you'll understand why.

### The Write Guarantee.

We're so sure you'll love 4WORD, we'll give you this guarantee: try 4WORD for 30 days and if you're not completely satisfied for any reason we'll take it back and send back your money. No questions asked. Call today. Or better yet, right now.

**1-800-556-1234 x528**
**(In CA 800-441-2345 x528)**

CIRCLE 192 ON READER SERVICE CARD

# 4WORD

**The Add-In Word Processor™ for 1-2-3**

**Only $99.95**
*Available at better dealers everywhere*

Please send me _____ copies of 4WORD for $99.95, plus $2.00 per unit shipping. ($12 per unit outside USA). CA residents add $7.00 sales tax per unit.
☐ I enclose $_____
☐ VISA ☐ MasterCard ☐ AMEX ☐ Diners Club
Card # _____ Exp. Date_____
Name _____
Company _____
Address _____
City/State/Zip _____
Phone (  ) _____
10201 Torre Avenue Cupertino, CA 95014 PC 5/12/87

Turner Hall Publishing
*A division of Symantec*
10201 Torre Ave., Cupertino, CA 95014 • (408) 253-9607

SQZ! and 4WORD The Add-In Word Processor are trademarks and Note-It is a registered trademark of Turner Hall Publishing. Lotus, Symphony, and 1-2-3 are registered trademarks and Lotus HAL is a trademark of Lotus Development Corp. Other brand and product names are trademarks of their respective holders.

or 1,200 bits per second and will work with other Bell 103-, 113-, or 212A-type modems.

**BASIC CHEAP MODEM** There are no special features hidden in the PCM1200; but if all you seek is an easy-to-install, basic modem, you won't be disappointed. In line noise tests, the PCM1200 made an average showing. It had little difficulty transferring data over clean lines, but it did run into problems trying to complete a transfer over exceptionally noisy lines. On the worst line, the PCM1200 could not make a complete transfer without errors. But when you consider the low cost of the modem and the usually good response you get, you may want to simply hang up, call again, and hope for a better line.

Another Transend offering is the PCM2400, which operates at either 2,400, 1,200, or 300 bps with automatic data rate fallback to 1,200. Unlike the PCM1200, the PCM2400 requires a full-size slot, but at $289 it, too, is inexpensive. Like its shorter brother, this modem is completely Hayes compatible and has a few more features to offer besides the faster speed.

You can install the PCM2400 as COM1 or COM2 simply by changing the jumper/strap combination on the card. Ten DIP switches are accessible from the back of the modem and let you set the configuration. There is no volume-control dial, and the only way to adjust the speaker volume is through a DIP switch that lets you select either low or high volume (a software command can turn the volume on or off). Even with the high-volume DIP switch tripped, I could barely hear what was going on during a call, and I wished for a way to increase the volume.

Except for the low-volume problem, the PCM2400 received high marks. Although not feature-laden, it has a few helpful extras: there is a real-time clock that can be set to record the length of your calls in hours, minutes, and seconds. You can select the terse or verbose command set or the extended response set for call-progress monitoring. The PCM2400 uses a Repeat command that you can put into a dialing sequence to repeat the call if no connection was made. It also has a mode that converts letters into digits before dialing.

In line-noise resistance tests, the PCM2400 made a strong showing. At 2,400 bps, the results were almost identical to the Hayes 2400B, showing a strong resistance to noisy lines. When set down to 1,200 bps, the modem still showed favorable results, although not as good as those of the Hayes 2400B.

When you consider the low cost of the PCM1200 ($159) and the PCM2400 ($289) and the favorable results achieved in the PC Labs tests, these modems are a good deal.—**Christopher Barr**

## U.S. Robotics Inc.

Despite its automatonlike moniker, U.S. Robotics specializes in making modems, not R2D2 clones. This is a very lackluster pair of external modems. It's not that the U.S. Robotics Courier 1200 and 2400 are bad products. They're just mediocre.

For instance, in tests against 1,200-bit-per-second modems from Hayes, IBM, and Novation, the Courier 1200 needed a cleaner phone line than the other modems to transmit the same data error-free. The difference between the products wasn't big—just a decibel or two in the various tests—but enough to make you think twice before buying a Courier. In an informal test against the Hayes Smartmodem 2400B, I found the Courier 2400, again, slightly less reliable under normal operating conditions.

If you make most of your calls on relatively clean local phone lines, you may never notice the Couriers' performance handicap, particularly if you use an error-correcting protocol. On the other hand, if you routinely dial up bulletin boards across the country on the Brand X long-distance service, you may be headed for some headaches.

All of this is especially unfortunate when you consider that the Couriers are not exactly bargain-basement specials; the 1,200-bps unit is priced at $499 and the 2,400-bps model retails for $599. For that kind of money, you should expect top-notch performance.

Performance aside, the Couriers are attractive modems. Packaged in sleek dark cabinets with blacked-out status light windows, they're quite fetching. As far as external modems go, the Couriers are mid-size units. They're not very tall (1½ inches high), but they are fairly deep (10¼ inches) and wide (6¼ inches).

Like most other external modems, the Couriers are capable of putting on a downright fascinating light show. The status lights have a purpose, of course, and that is to let you know just what's going on with your modem at any given time. This is where external modems have a significant advantage over their internal brethren. External modems may clutter up your desk-

PC MAGAZINE FACT FILE

**U.S. Robotics Inc**
8100 N.McCormick Blvd.
Skokie, IL 60076
(312) 982-5010

*The U.S. Robotics Courier modems deliver only average performance.*

① **U.S. Robotics Courier 1200**
**List Price:** $499
**Requires:** Serial interface.
**In Short:** A lackluster 1,200-bps external modem. It's good enough for local access chores but may not be able to deal with noisy lines. Good documentation and support.
CIRCLE **616** ON READER SERVICE CARD

② **U.S. Robotics Courier 2400**
**List Price:** $599
**Requires:** Serial interface.
**In Short:** A 2,400-bps external modem with mediocre performance. Noisy long-distance lines can throw it for a loop. Good documentation and support.
CIRCLE **615** ON READER SERVICE CARD

top to a certain extent, but they're tops at helping you track down the various causes of misconnections, disconnections, misdials, and no-dials.

The Couriers have a full complement of status lights, consisting of high-speed, auto-answer, carrier detect, off-hook, receive data, send data, terminal ready, modem ready, and analog loopback indicators. The modems also feature a pair of interchangeable RJ-11C jacks, a self-contained power transformer, an RS-232C port, and a side-mounted volume control. They're very complete units.

The Couriers' documentation is another attractive package element. The 84-page spiral-bound booklet includes a setup guide, a discussion of modem theory, a wealth of technical information, a troubleshooting guide, and configuration details for various telecommunications programs. Best of all, it's well written and understandable—no minor accomplishment in this era of lunkheaded documentation. Users who are prone to losing documentation

If you make most of your calls on relatively clean local phone lines, you may never notice the Couriers' performance handicap.

will also appreciate the Couriers' modem-generated help screens and the command summary printed on the bottom panel of the units.

**NO PEEKING** On the whole, both units appear to be well built, except for flimsy power and volume controls. I use the word *appear* because the Couriers are sealed shut at the factory and there is no easy way to open either modem to get a peek at the internal circuitry without damaging the unit. This also means that there is no simple way for the user—or the local repair technician—to open the modem for servicing. When the units break down (and everything does eventually), you'll probably have to get in touch with the manufacturer for repairs.

Hooking up an external modem is a task easily accomplished by even the most fumble-fingered PC user. Since the Couriers are packaged in their own discrete cases, there are none of the installation problems that are inherent with board-based modems (like destroying the innards of your modem with a single zap of static electricity).

Connecting one of the Couriers to a PC requires nothing more than configuring a row of DIP switches that are mounted on the unit's bottom panel and plugging in a set of transformer, phone line, and RS-232C cables (the latter aren't included with either modem). The entire process isn't much more difficult than hooking up a monochrome monitor and can be accomplished in something under 10 minutes.

Getting the modems to work with a telecommunications program is easy, too. The Couriers support most of the popular packages, including *Telpac*, *Crosstalk XVI*, *PC-Talk III*, *Smartcom* (Version 2.x), *Ascom*, *Telios*, *Mite*, *Blast*, *Data Capture/PC*, and *SmarTerm*.

The modems don't contain any on-board user-accessible memory (except for a small command-line buffer) or error-correction protocols, which is acceptable since most decent telecommunications packages provide these features anyway. The Couriers do, however, contain a superset of the industry-standard Hayes AT command set. Besides the Hayes-compatible software, the unit also has such useful features as call duration reporting, a modem setting display, a command repeat function, and an adaptive dialing option that automatically switches the modem over to pulse signals on lines that don't allow Touch-tone dialing. A quote mode enables users to dial an alphabetic number by placing the letters between quotation marks (as in 1-800-"DIAL USR").

In sum, the Couriers are a pair of handsomely styled modems with attractive LEDs, beautiful documentation, and a variety of powerful internal commands. If you don't consider on-line performance, these are a couple of great modems—but how can you ignore it when, in essence, it's the only feature that really counts?

The Couriers are great-looking modems. It's a pity their beauty is only skin-deep.—**John Edwards**

## U.S. Trade Research

Please do not confuse the $99 USTR Smartmodem 1200B with a Smartmodem 1200B made by any other manufacturer. In fact, for your own sake, please do not confuse U.S. Trade Research's Smartmodem 1200B with any modem.

Plainly put, this is a bad modem. If one judges a modem by how well it transfers data, the USTR Smartmodem falls flat on its face. This is a product that, when tested, was incapable of transmitting error-free data except on all but the cleanest of

PC MAGAZINE FACT FILE

**U.S. Trade Research**
16600 Harbor Blvd.
Fountain Valley, CA 92708
(714) 839-5727

*A $99 price tag is no bargain when performance falls short.*

**USTR Smartmodem 1200B**
**List Price:** $99
**Requires:** One half-length slot.
**In Short:** You get what you pay for, and in this case $99 doesn't get you very much. A very poor performer.

CIRCLE 611 ON READER SERVICE CARD

telephone lines. In practical terms, the unit ranks as one of the worst 1,200-bit-per-second performers on the market. In fact, when tested with over 50 other modems operating at 1,200 bps, the USTR Smartmodem was the only unit that failed to transmit without error unless placed on a line simulating the top 10 percent of AT&T's long-distance circuits.

This is unfortunate since, to judge by the looks of its circuit board, the USTR Smartmodem isn't a badly manufactured unit. The circuit board is well made, uses high-quality components, and features gold-plated connectors (including the phone jacks). It also includes such niceties as an on-board prewired speaker, an easily accessible rear-panel-mounted volume control, and dual RJ-11C phone jacks. The USTR Smartmodem doesn't look like a slapdash effort, but looks alone don't count in the modem business.

The board is fairly easy to install. It mounts relatively effortlessly into either a full- or half-size XT expansion slot. Configuring the modem involves setting two DIP switches and a pair of jumpers. Since the modem recognizes only ports COM1 and COM2, users may find themselves forced to reconfigure other serial-based peripherals to accommodate the modem.

Not surprisingly, considering its modest price, the USTR Smartmodem doesn't offer anything in the way of special features. It does, however, include a modified version of the Hayes command set. Most of the popular AT commands are available, but such entries as Cn, Fn, and Xn are not. When a nonsupported command is invoked, no action is taken and the modem responds with a blithe "OK," even if everything isn't necessarily OK with the user.

The USTR Smartmodem's documentation isn't all that bad for a bargain-basement peripheral. The 14-page booklet certinly won't win any technical writing achievement awards (especially in light of the numerous typos and misspellings), but it does manage to convey the necessary information in a coherent if often goofy manner. (*Modem* is sometimes spelled *modes*, and, in its first reference, the product is dubbed the "USTR Seartmodem 1200B.") Despite its diminutive size, the documentation also contains a fair amount of useful technical material.

Is this unit suitable for anyone? Perhaps. It may not be all that bad for the person who only occasionally needs a modem to call up a local database or BBS and who can't justify the cost of a $500 unit. Use of an error-correcting protocol will help rectify some of the modem's data transferring deficiencies. But not all databases and online services provide complete protocol support, of course, and you may be better off with a reliable 300-bps modem if cost is a major consideration.

Frankly, I think the U.S. Trade Research Smartmodem 1200B would have been a better product if its manufacturer had concentrated more on the Research and less on the Trade.—**John Edwards**

## Ven-Tel Inc.

Ven-Tel of Santa Clara, California, has been in business since 1975. After first simply producing Hayes-compatible modems at lower prices, Ven-Tel now has products with distinctive features that set them apart from the crowd. Although PC-compatible modems are its mainstay, Ven-Tel also manufactures rack-mounted products for mainframe use.

Simplicity, both in design and function, distinguishes the Ven-Tel PC Modem Half-Card. Packaged with Microstuf's venerable *Crosstalk XVI* communications software, it's an excellent value that will quickly set your PC up and talking.

The sparsely populated board appears to be well thought out and carefully manufactured, and it will fit into any PC slot, including slot 8 in the IBM PC-XT. Based on the ubiquitous Intel 8250 Universal Asynchronous Receiver/Transmitter (UART) and an 8051 microprocessor, it is purportedly fully compatible with the IBM Asynchronous Adapter. Because of design differences, however, it will appear to be faulty when tested with the IBM diagnostic software (a fact duly noted in the manual).

A minuscule piezoelectric speaker is mounted on the board so you can listen to the line-connection activity. While having a board-mounted speaker is certainly more convenient than connecting a modem to the PC's internal speaker, its sound level may be too low to hear in an office environment (particularly when buried within the confines of an AT with its hard disk and fan humming away). There is no volume control; you can only turn it off and on via software commands.

The rear mounting-tab has two RJ-11 phone jacks, and you can connect either one to the line or to the telephone, the use of which is optional.

Installing the PC Modem Half-Card into a PC is about as easy as it can be: plug it into any slot, attach the phone cord supplied to the wall jack, and turn the computer on. A bank of four DIP switches comes set to default to the COM2 port, but two of these can be reconfigured to allow the modem to act as COM1 through COM4. The other two switches control the modem's ability to auto-answer and determine whether the data terminal ready (DTR) signal is forced. A local analog loopback test mode can be called up to verify that the unit is functioning properly.

The manual supplied with the 1,200 bit-per-second Half-Card is sized to fit right in with the other three-ring binders on your PC software shelf. About one-third of the manual is devoted to details specifically about the modem itself—switch settings, internal register settings, and command executions. The remaining two-thirds of the document is a copy of the *Crosstalk XVI* manual.

While *Crosstalk XVI* may be getting a bit long in the tooth compared to newer communications package offerings, it remains an eminently serviceable package that will meet all but the most demanding needs. If you prefer to use another communications program, however, the Half-Card is fully compatible with all major packages.

The Half-Card, not unexpectedly, proved to be fully compatible with the industry-standard Hayes AT command set. A peek at PC Labs results shows that the Half-Card need make no apologies for its performance.

The Half-Card comes bundled with an introductory subscription to CompuServe and information about The Source, Dow Jones News/Retrieval, and Newsnet.

The external version of the 1,200-bps Half-Card has the advantage of plugging into systems based on any bus, although as 2,400-bps modems become more prevalent, this ability might be irrelevant.

**CLEAN DESIGN** The circuit board in the Ven-Tel 1200 Plus, based on the 8051 microprocessor, is very cleanly designed and assembled. With its low component count, there is ample real estate left over. Ven-Tel considerately used this extra room to print a meaningful description of the DIP switch settings and RS-232 pin functions—handy for those without time to search for the manual. Ven-Tel could have eliminated the extra board space and packaged the unit in a smaller enclosure. Sized as it is, it fits under a standard-size desktop telephone. An external modem could just as well be parked anywhere to free extra desk space. With the proliferation of telephone designs on the market today, so-called standard units are getting harder to find.

Ten DIP switches are used to control both communications functions, such as forcing DTR and DSR (data set ready), and operational parameters (for example, whether AT responses are displayed as English words or numeric codes). The board also has a tiny piezoelectric speaker to monitor line-connection activity, but the nonvented enclosure makes it virtually inaudible. Eight LEDs on the front-panel monitor communications line conditions.

On the back panel is a female RS-232 serial connector, two RJ-11 phone jacks (not interchangeable, but clearly marked), and a socket for the external power supply cord. The phone-line cable is supplied, but the serial cable must be provided by the user. Given that there is really no such thing as a standard RS-232 cable, this seems reasonable.

The power supply is notable for two features. First, the AC input is not integral with the box itself, thus allowing use with the seemingly universal multioutlet power strip. Second, the output connector locks securely to the modem, precluding the catastrophe that would be caused by the cat yanking the cord out as the last block of a large file transfer takes place. The only thing lacking here is a power switch—the unit is powered up whenever the power supply is active.

The biggest problem with the 1200 Plus is its casing. It seems a crime to package an otherwise high-quality board in a box that might just as well have been picked up at the corner hardware store. The top and bottom pieces of the unit submitted for review were sturdy aluminum extrusions, but they didn't fit together well at all: each time the modem was picked up the top fell off. The plastic front and back panels were warped a little, cheapening its appearance.

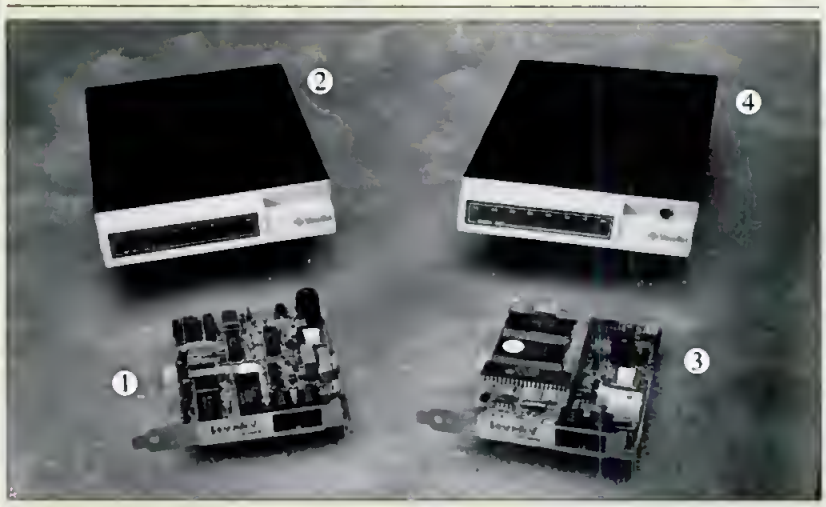
On a brighter note, the performance of the 1200 Plus leaves nothing to be desired. PC Labs tests showed its ability to handle noisy line conditions to be very good. All of the Hayes AT commands tossed its way were handled predictably.

All things considered, the 1200 Plus is a good, serviceable modem but certainly not a great one.

If you double the speed and number of circuit boards in the PC Modem Half-Card, you'll have a fair idea of what

## PC MAGAZINE FACT FILE

**Ven-Tel Inc**
2342 Walsh Ave.; Santa Clara, CA 95051; (408) 727-5721




*Ven-Tel is one of the oldest modem manufacturers around, and the company offers a diverse family of modems, all of which sport some unique features.*

**① Ven-Tel PC Modem Half-Card**
**List Price:** $275; bundled with *Crosstalk XVI* software, $399.
**Requires:** PC or compatible with one full- or half-length slot; 96K RAM needed for *Crosstalk*.
**In Short:** Ven-Tel's 1,200-bps Half-Card puts fine performance and Hayes compatibility on a pint-size board at a competitive price. When packaged with *Crosstalk*, it serves as a complete communications package.
CIRCLE 692 ON READER SERVICE CARD

**② Ven-Tel 1200 Plus**
**List Price:** $349
**Requires:** One RS-232 serial port, a serial cable, communications software.
**In Short:** The Ven-Tel 1200 Plus offers good performance and standard command compatibility at a competitive price, but it suffers from mediocre enclosure design.
CIRCLE 691 ON READER SERVICE CARD

**③ Ven-Tel Half-Card 24**
**List Price:** $475; bundled with *Crosstalk XVI* software, $599.
**Requires:** PC or compatible with one full- or half-length slot; 96K RAM needed for *Crosstalk*.
**In Short:** The Half-Card 24 combines 2,400-bps speed with full industry-standard AT command set compatibility on a board sized to fit any PC slot.
CIRCLE 690 ON READER SERVICE CARD

**④ Ven-Tel 2400 Plus**
**List Price:** $599
**Requires:** One RS-232 serial port, a serial cable, communications software.
**In Short:** The 2400 Plus is notable for its 2,400-bps speed, very good performance, and compatibility with the Hayes command set, but, like its 1,200-bps counterpart, it is hindered by a second-rate case.
CIRCLE 689 ON READER SERVICE CARD

# Savings, support,

✓ **denotes IBM-AT compatibility.**
★ **denotes IBM-PCjr compatibility.**
**CP**—copy-protected, **NCP**—not copy-protected

## SOFTWARE

We only carry the latest versions of products Version numbers in our ads are current at press time.

**Alpha Software ... NCP**
★ ✓ Keyworks 2.0 ... $49
✓ Alpha/three 1.0 ... 223
**American Small Business Computers**
✓ Pro Design II 2.5 *(NCP)* ... 169
**Application Techniques ... NCP**
✓ Pizazz 1.0 ... 35
**Ashton-Tate ... NCP**
✓ dBase III Plus 1.1 ... call
✓ Framework II 1.1 ... call
✓ Sign-Master 5.1 *(CP)* ... 149
✓ Diagram-Master 5 01 *(CP)* ... 199
✓ Chart-Master 6 2 *(CP)* ... 229
✓ Map-Master 1.0 *(CP)* ... 239
✓ MultiMate 3.31 ... call
✓ MultiMate Advantage 3.6 ... call
**Best Programs ... NCP**
✓ PC/Tax Cut *(1987 vers for 1986 taxes)* ... 49
**Bible Research ... NCP**
✓ THE WORD 3.1 *(KJV Bible)* ... 159
✓ THE WORD 3 1 *(NIV Bible)* ... 159
**Borland International ... NCP**
★ ✓ Turbo Tutor 2.0 ... 24
★ ✓ Turbo Database Toolbox 1.2 ... 41
✓ Turbo Graphix Toolbox 1 0 ... 41.
✓ Turbo Lightning 1 0 ... 59
✓ Eureka 1.0 ... 59
✓ Turbo C 1 0 ... 59
✓ Turbo BASIC 1 0 ... 59
✓ Word Wizard 1 0 ... 41.
★ ✓ Turbo Pascal 3.0 w/BCD & 8087 support ... 59
★ ✓ Turbo Pascal w/Turbo Tutor ... 75
✓ Turbo Prolog 1.1 ... 59.
✓ Turbo Prolog Toolbox 1 0 ... 59.
✓ Turbo Jumbo Pack ... 169
★ ✓ Sidekick 1.5 ... 51
★ ✓ Traveling Sidekick 1.0 ... 43
★ ✓ Traveling Sidekick w/Sidekick. ... 73
✓ Reflex 1.1 ... 87
✓ Reflex Workshop 1.0 ... 41.
★ ✓ Superkey 1.1 ... 59.
**Breakthrough ... NCP**
✓ Timeline 2.0. ... 239
**Broderbund ... CP**
★ ✓ Print Shop ... 35
★ ✓ Print Shop Companion ... 33.
★ ✓ Graphics Library 1 ... 22.
★ ✓ Graphics Library 2 ... 22
**Chipsoft ... NCP**
✓ TurboTax 4.0 *(1987 vers. for 1986 taxes)* ... 45
**Computer Associates ... NCP**
✓ Spreadsheet Auditor 3.0 *(check your work)* ... 89.
✓ SuperCalc 4 1 0 ... 309

### PC Connection Software Special
*through May 31, 1987*

**MICROPRO ... NCP**
**✓ WordStar Professional Release 4**

As 1-2-3 is to spreadsheets, WordStar is to word processing. More of you use WordStar on a wider variety of computers than virtually anything else. For all of you who don't know the power of the 'Star, Micropro is even throwing in your choice of a $100 rebate or some nifty free software (while supplies last) when you buy Release 4

- Over 125 new features and enhancements, including Undelete, Math, Line/Box drawing, Macros, and more
- Integrated 220,000 word thesaurus and 87,000 word spelling checker
- You can use the familiar CTRL key operators, function keys, or menus to move through the program
- Full WYSIWYG mode, and (finally) full DOS Path Support

For the IBM PC, XT & AT ... $259

**Crosstalk Communications ... NCP**
★ ✓ Crosstalk XVI 3.61 ... 95
✓ Remote 1 3 ... 95.
**Dac Software ... NCP**
✓ Dac Easy Mate ... 26
✓ Dac Easy Base ... 32
✓ Dac Easy Payroll ... 32.
★ ✓ Dac Easy Accounting ... 45
**Executive Systems ... NCP**
✓ XTREE 2.0 ... 34
✓ Hot 3 0 *(DOS utility)* ... 41.
**5th Generation ... NCP**
✓ Fastback 5 14 ... 89
**Generic Software ... NCP**
✓ Generic CADD 2 0 ... 69
✓ Dot Plot ... 18
✓ Auto Dimensioning ... 35
**Hilgraeve Software ... NCP**
✓ HyperAccess 3.12 ... 89
**Harvard Associates ... NCP**
★ ✓ PC LOGO 2.0 ... 89
**Hayes ... NCP**
✓ Smartcom II 2.1 ... 89
**Infocom ... NCP**
✓ Cornerstone 5 2 ... 59
**Intersecting Concepts ... NCP**
✓ Backup Master 1 02 ... 59.
**Lifetree ... NCP**
✓ Volkswriter Deluxe Plus 1.0 ... 69
✓ Volkswriter 3 1 0 ... 147

**Micro Education (MECA) ... CP**
✓ Managing Your Money 3 0 ... $115
✓ Managing the Market 1 0 ... 85
**Micropro ... NCP**
✓ WordStar Professional Release 4 0 ... special
*$100 rebate from Micropro while supplies last.*
✓ WordStar 2000 Plus Release 2 ... 285
**Microrim ... NCP**
✓ R:base System V 1 1 ... 359.
✓ R:base Graphics 1 0 ... 159
**Microsoft ... NCP**
✓ Windows 1 03 ... 65
✓ Multiplan 3 0 ... 119.
✓ Chart 2 02 ... 189.
✓ Word 3 1 ... 279
✓ Project 3 0 ... 239
*LANGUAGES*
✓ Quick Basic 2 01 ... 59
✓ Macro Assembler 4 0 ... 97.
✓ FORTRAN Compiler 4 0 ... 289.
✓ C Compiler 4 0 ... 279
**Monogram ... NCP**
✓ Dollars & Sense 2 0 ... 105
**Nantucket Software ... NCP**
✓ Clipper *(Autumn '86)* ... 399
**Nolo Press ... NCP**
★ ✓ WillWriter 1 0 ... 35.
**Paul Mace**
✓ Mace Utilities 4 0 ... 59
**Paperback Software ... CP**
✓ VP-Planner 1 3 ... 57.
✓ VP-Info 1.0 ... 57.
✓ VP-Expert 1.0 ... 57
**Personics ... NCP**
✓ SmartNotes 1 4 ... 49.
**Peter Norton ... NCP**
★ ✓ Norton Commander 1 0 ... 39
★ ✓ Norton Utilities 4 0 ... 57
✓ Advanced Utilities 1 0 ... 89
**Quarterdeck ... NCP**
✓ DESQView 1.3. ... 65
**Simon & Schuster ... NCP**
★ ✓ Webster's New World Speller 1 3 ... 39
★ ✓ Webster's New World Thesaurus 1 0 ... 43
✓ Webster's New World Writer 1 01 ... 85
**Softlogic Solutions ... NCP**
✓ Double DOS 4 0 ... 35
✓ Software Carousel 2.0 ... 35.
✓ Disk Optimizer 2 01 ... 35
**Software Publishing ... NCP**
✓ PFS Personal Publisher 1.0 ... 89
✓ PFS First Choice 1.0 ... 109
✓ PFS Professional Write 1.0 ... 119.
✓ PFS Professional File 1.0 ... 149.
✓ Harvard Presentation Graphics A 02 ... 239.
✓ Harvard Total Project Manager 2 0. ... 349.
✓ Harvard Professional Publisher 1.0 ... 409
**Springboard ... CP**
✓ Newsroom ... 35
✓ Certificate Maker *(NCP)* ... 34
✓ Newsroom•Pro *(NCP)* ... 79
**Symantec ... NCP**
✓ Q & A 2.0 ... 219

For the IBM-PC (XT & AT) *Exclusively.*

PC CONNECTION®

# service, & smiles.

**True BASIC, Inc. ... NCP**
- True BASIC 2.0 . . . $109
- True BASIC Libraries *each* 32

**Turner Hall ... NCP**
- SQZ! 1.5 . . . 49
- 4 Word 1.0 . . . 59
- Note-It 2.0 . . . 49

**WordPerfect Corp. ... NCP**
- WordPerfect Library 1.0 . . . 59
- WordPerfect 4.2 . . . 239.

## TRAINING

**ATI ... CP**
- ★ *SKILL BUILDER PROGRAMS*
  PC-DOS MS-DOS BASIC
  IBM-PC DOS-Reference *(NCP)* . . . *each* 33
- ★ *TRAINING POWER PROGRAMS*
  Lotus 1-2-3 Wordperfect dBase III Plus
  WordStar Displaywrite 3 . . . *each* 43

**Individual Software ... CP**
- ★ The Instructor II . . . 26.
- ★ Professor DOS . . . 33.
- ★ Tutorial Set *(both items above)* . . . 49
- ★ Typing Instructor II . . . 26.
- ★ Training for Lotus 1-2-3 *(for vers. 1A & 2)* . . . 37.

**Microsoft ... NCP**
- ★ Learning DOS *(for any version)* . . . 33.

**Simon & Schuster ... NCP**
- ★ Typing Tutor III 1.5 . . . 33

## EDUCATIONAL

**Blue Chip ... CP**
- ★ Millionaire . . . 36

**Barron's ... CP**
- ★ Computer SAT . . . 35

**Designware ... CP**
- ★ Spellicopter *(ages 6 to adult, reqs. CGA)* . . . 22

**Eduware ... CP**
- ★ Algebra 1,2,3, or 4 *(reqs. CGA)* . . . 22

**Stone & Associates ... CP** *(reqs. CGA)*
- ★ My Letters,Numbers,Words *(ages 1 to 5)* . . . 27
- ★ Kids Stuff *(ages 3 to 8)* . . . 27

**True BASIC, Inc. ... NCP**
- Calculus . . . 32
- PreCalculus . . . 32
- Trigonometry . . . 32.

## RECREATIONAL

**Electronic Arts ... NCP**
- Starflight *(reqs. CGA)* . . . 32
- Chessmaster 2000 *(reqs. CGA)* 32

**Hayden Software ... CP**
- ★ Sargon III *(Chess program)* . . . 32.

**★ Infocom ... NCP**
Enchanter Moonmist
Leather Goddesses of Phobos
Hitchhiker's Guide . . . *each* 25.
Zork Trilogy . . . 49.

**Microleague Sports ... CP**
- ★ Microleague Baseball *(reqs. CGA)* . . . 25.

**Microprose ... CP**
- ★ F-15 Srike Eagle *(reqs. CGA)* . . . 22.
- ★ Silent Service *(reqs. CGA)* . . . 22.

**Microsoft ... CP**
- ★ Flight Simulator 2.13 *(reqs. graphics brd.)* 32.

**Mindscape ... CP**
- Balance of Power *(reqs. graphics brd.)* . . . 30.

**1Step Software ... CP** *(reqs. CGA)*
- ★ Golf's Best *(Pinehurst or St. Andrew's)* . . . 19.

**Parlor Software ... CP**
- Bridge Parlor *(best Bridge simulation)* . . . 49.

**Sierra On-Line ... CP**
- King's Quest III *(reqs. CGA)* . . . 33

**Simon & Schuster ... CP**
- ★ Star Trek/Kobayashi . . . 27.

**Spectrum Holobyte ... CP**
- Orbiter *(Shuttle simulation, reqs. CGA)* . . . 27

**Sublogic ... CP**
- ★ Jet *(reqs. graphics brd.)* . . . 33

**XOR ... NCP**
- NFL Challenge . . . 79.

### PC Connection Hardware Special
*through May 31, 1987*

**INTEL**
- **Aboveboard 286**
- **Aboveboerd PS/286**

Just when you thought it was safe to button up your PC, Intel comes up with another winner. The new Aboveboard 286 and Aboveboard PS/286 are the most versatile expansion boards ever to grace the marketplace. What's even better, they have an entirely switchless installation procedure. Read on for more...

- Perfect for the IBM PC or XT; both provide up to 2 Meg of memory
- The Aboveboard PS/286 also has parallel and serial ports with an optional 2nd serial port
- These exact same boards (no foolin') will also fit in the IBM AT and XT 286. If this sounds unbelievable, call us to find out how they do it
- Switchless installation—entire process handled by software

For the IBM PC, XT, AT, & XT 286
Aboveboard 286 . . . $439.
Aboveboard PS/286 . . . 469.

## HARDWARE

Manufacturer's minimum limited warranty period is listed after each company name. Some products in their line may have longer warranty periods.

**AST Research ... 2 years**
*All boards listed (except Piggyback) include a FREE copy of DESQView*
- SixPakPlus 64k C/S/P . . . $169
- SixPakPlus 384k C/S/P *(fully populated)* 209
- SixPakPremium 256k C/S/P *(upgrades to 1 Mb or 2 Mb w/Piggyback)* . . . call
- SixPakPremium Piggyback Board 256k . 189
- Advantage Premium 512k S/P *(upgrades to 1 Mb or 2 Mb w/Piggyback)* . . . call
- Advantage Premium Piggyback 512k . . . . 289
- RAMpage! 256k *(upgrades to 2Mb)* . . . call
- RAMpage! 286 512k *(upgrades to 2Mb)* . . . call
- RAMpage/EGA 512k *(for the IBM-AT)* . . . . call

*AST Premium series boards and RAMpage! boards support EMS and fully support EEMS.*

**Amdek ... 2 years**
- Video 310A Amber monochrome monitor 159
- Video 410A Amber monochrome monitor 169
- Color 722 *(EGA compatible)* . . . 499.

**Compucable ... lifetime**
- Smartmodem-to-AT cable *(9 feet)* . . . 19.
- 15-foot Parallel Printer cable . . . 27.
- 2-Position *(AB switch box)* . . . 39.
- 3-Position *(ABC switch box)* . . . 65.

**Cuesta ... 1 year**
- Datasaver 400 Watt *(backup power unit)* . . . 499.

**Curtis ... lifetime**
*ACCESSORIES*
- Printer Stand . . . 18.
- ★ Universal System Stand . . . 25.

*CABLES*
Smartmodem-to-PC Cable *(9 feet)* . . . 17.
- Keyboard Extension Cable *(3 to 9 feet)* . . . . 27.
- Extension Cables for IBM Mono Display . . . 33.
- Printer-to-IBM cable *(9 feet)* . . . 17.

*SURGE SUPPRESSORS*
- ★ Safestrip *(6 outlets)* . . . 21.
- ★ Diamond *(6 outlets)* . . . 29.
- ★ Diamond-Plus *(w/FAX & modem protection)* 41
- ★ Emerald *(6 outlets; 6 ft cord)* . . . 36.
- ★ Sapphire *(3 outlets; EMI/RFI filtered)* . . . 47
- ★ Ruby *(6 outlets; EMI/RFI filtered, 6 ft cord)* . 55
- ★ Ruby-Plus *(w/FAX & modem protection)* . . 65

**DCA ... 1 year**
- Irma *(3270 emulation board)* . . . 729.

**Epson ... 1 year**
- EX-800 printer *(80 col., 300 cps)* . . . 469
- EX-1000 printer *(136 col., 300 cps)* . . . 629
- *NEW* FX-86e printer *(80 col., 200 cps)* . . . 399.
- *NEW* FX-286e *(136 col., 200 cps)* . . . 579.
- LX-86 printer *(80 col., 120 cps)* . . . 225.
- LQ-800 printer *(80 col., 180 cps)* . . . 519.
- LQ-1000 printer *(136 col., 180 cps)* . . . 689
- LQ-2500 printer *(136 col., 324 cps)* . . . 1089.
- *Printer-to-IBM cable (6 feet)* . . . 15.

# 1-800/243-8088

**PC Connection**
6 Mill Street
Marlow, NH 03456
603/446-3383

360M

For the IBM-PC (XT & AT) *Exclusively.*

# PC CONNECTION®

COPYRIGHT PC CONNECTION, INC., 1987 ALL ITEMS SUBJECT TO AVAILABILITY PRICES SUBJECT TO CHANGE WITHOUT NOTICE

# 800/243-8088.

**Everex ... 1 year**
- Evercom II 1200 Internal Modem . . . $119
- Evercom II 2400 Internal Modem . . . 199

**5th Generation ... 6 months**
- Logical Connection 256k . . . 319

**Hayes ... 2 years**
- Smartmodem 1200 . . . 369
- Smartmodem 1200B *(w/Smartcom II)* . . . call
- Smartmodem 1200B *(no software)* . . . call
- Smartmodem 2400 . . . 569
- Smartmodem 2400B *(w/Smartcom II)* . . . call

**Hercules ... 2 years**
- Hercules Color Card *(CGA)* . . . 159
- Hercules Graphics Card Plus . . . 189

**Intel ... 5 years**
- Above Board PC 64k *(upgrades to 2 Meg)* . . . 239
- Above Board AT 128k *(upgrades to 2 Meg)* . . . 354
- Above Board PS-PC 64k C/S/P . . . 259
- Above Board PS-AT 128k S/P . . . 379
- Inboard 386/AT *(req. cable)* . . . call
- Inboard 386/AT Cable *(specify computer)* . . . call
- 8087 *(for IBM-PC & XT)* . . . 114
- 80287 *(for IBM-PC AT & XT 286)* . . . 195
- 80287-8 *(for 8 MHz AT compatibles)* . . . 249

**Kensington Microware ... 1 year**
- ★ Masterpiece . . . 94
- ★ Masterpiece Remote . . . 119

**key tronic ... 90 days**
- 5151 keyboard *(deluxe)* . . . 169

**Kraft ... 1 year**
- 3 Button Joystick . . . 33
- Micromouse . . . 65

**Microsoft ... 1 year**
- Bus Mouse 6.0 w/Show Partner . . . 119
- Serial Mouse 6.0 w/Show Partner . . . 129
- Mach 10 *(includes Windows and mouse)* . . . 369

**Migent ... 1 year**
- Pocket Modem *(ext., 1200 baud, w/software)* . . . 167

**Mouse Systems ... lifetime**
- PC Mouse with Pop-up Menus . . . 99
- Bus Mouse with Pop-up Menus . . . 109
- PC Paint Plus 2.0 . . . 57

**NEC ... 2 years**
- Multisync monitor *(EGA compatible)* . . . 589
- GB-1 Board . . . 389

**NSI Logic ... 3 years**
- Smart EGA . . . 299

**Orchid Technologies ... 2 years**
- Tiny Turbo 286 . . . call
- PC Turbo 286e w/1 Meg . . . call
- Turbo EGA . . . call
- Jet 386 . . . 869

**Practical Peripherals ... 5 years**
- Microbuffer Mini *(parallel print buffer w/128k)* . . . 79
- Microbuffer Inline *(parallel print buffer w/256k)* . . . 149
- Microbuffer Inline *(serial print buffer w/256k)* . . . 149

**Princeton Graphics ... 1 year**
- MAX-12E Amber monochrome monitor . . . 179
- ★ HX-12E *(EGA compatible)* . . . 539

**SMA ... 30-day money-back guarantee**

PC-Documate Keyboard Templates
- DOS/Basic 3.0-3.1
- Lotus 1-2-3
- Symphony
- dBase III
- MultiMate
- WordPerfect
- WordStar
- WordStar 2000

each $12

**Toshiba ... 1 year**
- P321 S/P printer *(80 col., 216 cps)* . . . 479
- P351 S/P printer Mod 2 *(136 col., 288 cps)* . . . 949
- Toshiba T1100 PLUS Laptop Computer . . . call
- Toshiba T3100 Laptop Computer . . . call

**Tseng Labs ... 1 year**
- EVA 480 *(supports 640x480 res., includes Dr Halo II & drivers for Autocad & Lotus 1-2-3)* . . . 369

**Video 7 ... 2 years**
- VEGA Deluxe *(supports 640x480)* . . . 379

## DRIVES

**Control Data Corp. ... 1 year**
- 70 Meg (formatted capacity) Int. Hard Drive for IBM PC or XT *(w/Western Digital controller & cables, & Wren Manager II software, 28 ms)* . . . 1069
- 70 Meg (formatted capacity) Int. Hard Drive for IBM AT *(w/Wren Manager II software, 28 ms)* . . . 997

**IOMEGA ... 1 year**
- Bernoulli Box 20 Meg w/PC2 card . . . 1849
- 10 Meg cartridge . . . 57
- Bernoulli Box 40 Meg w/PC2 card . . . 2449
- 20 Meg cartridge . . . 79
- PC2B (Bootable) Card . . . 229
- Bernoulli Box Care Kit . . . 79

**Mountain Computer ... 1 year**
- Drive Card 20 Meg *(80 ms)* . . . 499
- Drive Card 30 Meg *(78 ms)* . . . 589

**Seagate ... 1 year**
- 20 Meg Internal Hard Drive *(w/HDC controller and cables, 65 ms)* . . . 339
- AT 30 Meg Internal Hard Drive *(w/cables & instructions, 39 ms)* . . . 589
- 20 Meg Internal Hard Drive *(w/Western Digital controller and cables, 65 ms)* . . . 369
- 30 Meg Internal Hard Drive *(w/Adaptec RLL controller and cables, 65 ms)* . . . 429

**TEAC ... 1 year**
- PC, XT 360k Drive *(5¼" half-height)* . . . 109

**Toshiba ... 1 year**
- PC, XT 360k Drive *(5¼" half-height)* . . . 109
- AT 360k Drive *(5¼" half-height)* . . . 117
- AT 1.2 Meg Drive *(5¼" half-height)* . . . 135

**Western Digital ... 1 year**
- File Card 20 Meg *(w/XTREE, 80 ms)* . . . 499

## MEMORY
- 64k Upgrade Set *(150 ns, set of 9)* . . . 12
- 256k Upgrade Set *(150 ns, set of 9)* . . . 29

## 1-800/243-8088


**PC Connection**
6 Mill Street
Marlow, NH 03456
603/446-3383


360M

## DISKS

All disks have a lifetime warranty

**DS/DD Disks** for the PC & XT (40 TPI)
- ★ Fuji MD2D *(10 disks per box)* . . . $12
- ★ Verbatim Datalife *(10 disks per box)* . . . 15
- ★ Maxell MD-2 *(10 disks per box)* . . . 15

**DS/High Density Disks** for the AT (96 TPI)
- Fuji *(10 disks per box)* . . . 24
- Verbatim *(10 disks per box)* . . . 27
- Maxell *(10 disks per box)* . . . 27

**3½" Double-sided Diskettes** *(720k)*
- Sony *(10 disks per box)* . . . 23
- Maxell *(10 disks per box)* . . . 23

## MISCELLANEOUS
- ★ **Compuserva Information Service** *(includes subscription, manual, $25 usage credit, monthly publications)* . . . 24
- ★ **Dow Jones** Membership Kit . . . 24

**Innovative Concepts**
- ★ Flip n' File *50 (holds 50 disks)* . . . 16
- ★ Flip Sort *(holds 70 disks)* . . . 15

**PC Connection**
- ★ Computer Toolkit *(all the tools you need to go with your PC in a software style binder)* . . . 29

## OUR POLICY
- We accept VISA and MASTERCARD
- No surcharge added for credit card orders
- Your card is not charged until we ship
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order
- No sales tax
- All U.S. shipments insured, no additional charge
- APO/FPO orders usually shipped 1st Class Mail
- Allow 1 week for personal and company checks to clear
- UPS Next Day Air available
- COD max. $1000. Cash or certified check
- 120 day limited warranty on all products *
- To order: call us anytime Monday thru Friday 9:00 to 9:00, or Saturday 9:00 to 5:30. You can call our business offices at 603/446-3383 Monday through Friday 9:00 to 5:30

## SHIPPING

**Note:** Accounts on net terms pay actual shipping

**Continental US:**
- For monitors, printers, and drives: add 2% for UPS ground. Call for UPS 2nd-Day & Next-Day Air
- For computers, pay actual charges. Call for UPS 2nd-Day & Next-Day Air
- For all other items, add $2 per order to cover UPS Shipping. For such items we automatically use UPS 2nd-Day Air at no extra charge if you are more than 2 days from us by UPS ground

**Hawaii:**
- For monitors, printers, and drives, actual UPS Blue charge will be added. For all other items, add $2 per order

**Alaska and outside Continental US:**
- Call 603/446-3383 for information

For the IBM-PC (XT & AT) *Exclusively.*

# PC CONNECTION®

* DEFECTIVE SOFTWARE REPLACED IMMEDIATELY. DEFECTIVE HARDWARE REPLACED OR REPAIRED AT OUR DISCRETION. SOME ITEMS HAVE MANUFACTURERS WARRANTIES UP TO FIVE YEARS

# PC Power.

**Sparks will fly!**
There's nothing like a bolt out of the blue to put a bolt into your Blue. But the one thing you don't need is a hair-raising experience. That's why high-powered micro users turn to the thunderstruck town of Marlow, NH (pop. 546) for all their add-on and software requirements.

We understand that there's no reason to wait around 100 milliseconds for something you could do in 50. Or to be running only 1 program at a time when you could be running 20. Our sales consultants combine expert knowledge and the occasional hot flash of genius to make sure that the products you want fit into your existing configuration. Give us a call before you buy, and we'll make sure you don't get burned. (Chalk it up to our animal instincts).

**Bytes make right.**
You want more speed? More drive? More RAM tough power? You want to blow the ports off your PC? Talk to the people who gave brute force a good name. We'll electrify your CPU, run rings around your resolution, and manhandle mountains of memory into your micro.

And, our prices are proof there's strength in numbers. We can muscle up your micro without bludgeoning your budget. So stop letting those power users push you around, already. Show your stuff. Give us a call.

**Expose your next bright idea with the flashy PC Connection Light. Comes with different colored lenses, flood-to-spot focussing and more. Offer not available to net accounts. Limit one per customer.**

**Lighten up!**
As any politician will tell you, if you want power, you first must acquire an other-worldly glow (or at least a good tan). Well, there's an easier way to light up your life — just tune in and turn on your PC Connection micro flashlight. It's free to anyone who places an order of $750 or more between now and June 30.

Just call 1-800/243-8088 or 1-603/446-3383, M-F 9:00 to 9:00; Saturday to 5:30. If you're planning to visit, call ahead to make sure what you want is in stock.

**For the IBM-PC (XT & AT) exclusively.**

PC CONNECTION®

©COPYRIGHT PC CONNECTION, INC. 1987. THE RACCOON CHARACTER(S) IS A TRADEMARK OF PC CONNECTION, INC. PC CONNECTION IS A REGISTERED TRADEMARK OF PC CONNECTION, INC., MARLOW, NH.

the Ven-Tel Half-Card 24 is all about.

About 3 years ago, high-speed (2,400 bps and up) communications started creeping into the PC-to-mainframe business community, where long-distance telephone rates were a major factor when transferring large files back and forth. Now modem prices have declined to a point where the average PC user can benefit from the additional speed without crippling his budget.

**PIGGYBACKED BOARDS** The Half-Card 24 consists of two boards piggybacked to fit into one half-sized slot, including the XT's slot 8. The main circuit board is very similar to the 1,200-bps Half-Card, with the same rather anemic piezoelectric speaker.

In addition, the 2,400-bps unit has a second, smaller board squeezed on top of it containing the widely utilized Rockwell VLSI (very large scale integration) high-speed modem chip set. The piggyback board is connected by single in-line headers at both ends and secured with plastic screws. Despite this layered arrangement, the board will not intrude on the space required by other cards in adjacent slots.

Installing the Half-Card 24 is as simple as it is with the 1,200-bps model. With all six DIP switches set to the open position (the default configuration), the Half-Card 24, along with the version of *Crosstalk XVI* supplied, runs right off the bat.

A bank of six DIP switches, residing along the top of the main board, is easily accessible without removing the modem from the PC. They control which of four communications ports is to be recognized, determine whether the DTR signal is forced, plus indicate carrier detect recognition and IBM PC-XT slot 8 compatibility. The rear mounting strap has two RJ-11 jacks, either of which can be used for phone or wall connections.

The Half-Card 24's firmware contains routines for local analog and remote digital self-tests. These are initiated with Hayes AT commands, all of which appear to be fully compatible with this product.

*Crosstalk XVI*'s latest incarnation, Version 3.60, includes a number of features that mate well with the Half-Card 24. The software now adjusts automatically to the communications speed detected by the modem. For example, if the program is set to default to 2,400 bps, it will roll back to 1,200 or 300 bps if that speed is detected at the receiving end. Also included with this release are improvements to the VT100 terminal emulation mode and support for the IBM Enhanced Graphics Adapter.

On-line performance is where the Half-Card 24 really shines. The test results show it to be one of the most resistant to problems with noisy phone lines. And it even handled a deliberate attempt to ruin a connection by taking the phone off the hook while it was logged onto another computer—an act that will cause some modems to hang up.

Small, fast, simple, and ready to use right out of the box, the Half-Card 24 rates as an exceptional value.

Increased performance, more features, and the likelihood that it will not become obsolete for quite some time help the Ven-Tel 2400 Plus modem overcome the same abysmal box that plagues its 1,200-bps sibling. In the case of the 2400 Plus, the top of the unit was sufficiently tight-fitting that it did not fall off when handled, but the plastic end panels were warped enough to leave an ⅛-inch gap near the front. While certainly not a desirable feature, this gap did make it easier to hear the little on-board speaker.

The back panel has an RS-232 serial connector, separate RJ-11 jacks for the telephone and phone line (the cord for which is supplied), power switch, and a locking connector for the external power supply cord. Since there is no telling what type of personal computer the 2400 Plus might be connected to, no serial cable is supplied.

On the front are eight LEDs that monitor such signals as carrier detect, receive data, send data, and so forth. One of these indicates which speed the modem is operating at in a novel fashion: at 300 bps, it does nothing; at 1,200 bps, it glows red; at 2,400 bps, it changes to green.

Also on the front panel is a single push-button switch that can be used to dial a single number stored in nonvolatile memory. The number is placed in memory using the AT&Z command. The same switch can also be used (by pressing it for one second) to force the modem to hang up and go off-line.

Inside the case lies a carefully constructed circuit board based on the Rockwell VLSI modem chip pair. Everything but the 64K ROM chip is soldered into place. The socketed ROM allows for the possibility of future upgrades or perhaps custom programming.

The 2400 Plus performed as advertised—right out of the box—with a number of software packages. The Hayes AT command set seems to be fully supported, including some new commands written specifically for features of this particular modem. In the event that some communications parameter needs to be changed, there are 20 DIP switches on the circuit board for this purpose. Thoughtfully, Ven-Tel placed a list of switch options with their meanings and default settings for PC or terminal use right on the inside of the top cover.

The documentation supplied with the 2400 Plus is well organized and complete. It not only describes the operation of this modem but also includes information about communications rates, synchronous versus asynchronous modes, and more.

An added feature of the 2400 Plus is its ability to communicate with another computer in synchronous mode if the hardware on the other end supports it. Not yet widely used in PC-to-PC communications, synchronous mode has been used for years in the mainframe industry because of its efficiency.

With better-than-average performance, versatility, and the likelihood of a long life, one can only wish that Ven-Tel would come up with a better box to mount this fine modem in.—**Frank Bican**

## Visionary Electronics Inc.

If Hayes makes a smart modem, then Visionary Electronics makes a truly brilliant one. Besides the normal auto-answer and auto-dial features, the Visionary 1200 has a real-time clock, a 48K-byte buffer, and many advanced programming features.

At first glance the Visionary 1200 looks quite ordinary, but a look at the manual reveals the power locked in its plain gray wrapper. In fact, the Visionary has many features that you would expect to find in

good communications software but not in a modem.

The Visionary modem can receive calls and store them in its 8K (48K optional) buffer until you read the buffer with your PC. It can require a password before granting access and even has a dial-back feature for greater security. (See "For Your Ears Only: PC Security Modems," *PC Magazine*, Volume 6 Number 4.) By using the real-time clock you can program the modem to answer the phone only between 9 P.M. and 6 A.M., a feature that will make bulletin board operators happy.

You can also write scripts for your favorite on-line services, and the Visionary modem will call up and log in for you. You can even program it to call MCI Mail (or some other service) and download all your messages. Users of mail services with day and night rates can program it to download all their messages when rates are lower. These scripts can be run by keyboard command, at a prespecified time or by pressing one of the three programmable buttons on the side of the modem.

Telex users have always had problems connecting their PCs to the telex network. When someone sends you a telex, they expect that your telex terminal will answer the phone, respond with its answerback (so they can verify that it's you), and then print the message. If you are using a PC for your telex terminal and it's turned off or just not running the communications software, then you can't receive messages. Even worse, if your PC is running a background program to receive telexes and you turn it off without saving to disk, that message is lost forever.

The Visionary 1200 is perfect for telex users. It can receive telex messages from RCA, Western Union, or other services in real time and store them until you want to read them. It can also print telexes as they are received through its serial printer port.

While PC Labs was not able to test the Visionary modem on the TAS modem tester (due to some unspecified Hayes incompatibility), it performed flawlessly in my real-world testing, which included several long-distance calls to MCI Mail nodes around the country.—**Howard Marks**

PC MAGAZINE FACT FILE

**Visionary Electronics Inc.**
141 Parker Ave.
San Francisco, CA 94118
(415) 751-8811

*The Visionary 1200 is an extremely intelligent modem, perfect for telexes.*

**Visionary 1200**
**List Price:** $495 with 8K buffer; $595 with 48K buffer.
**Requires:** Serial port.
**In Short:** The Visionary 1200 provides many advanced programming features and is perfect for telex and similar unattended-use applications.
CIRCLE **463** ON READER SERVICE CARD

## Worthington-Babcock Inc.

The Worthington-Babcock Turbolink 1200, which comes to us from Worthington-Babcock of Portland, Oregon, via Taiwan, is an inexpensive external modem that is so bad at resisting line noise that you may find the sounds of your favorite radio station emerging from its speaker.

I have no quarrel with the Turbolink 1200's Hayes compatibility. It understands most AT commands at 300 and 1,200 bits per second. It auto-dials and redials. It runs major AT-command-set-based software, including *Crosstalk*, *Smartcom II*, and *PC-Talk*. Although it has some minor compatibility problems (for example, after you hit an escape sequence on-line (+++) and then try to return on-line (ATD), it hangs up the line), the Turbolink 1200 is still serviceably compatible.

Also, like the Hayes Smartmodem, the Turbolink 1200 is easy to install: you merely plug a serial cable (supplied for a few dollars more) into a serial card inside the PC and run a standard RJ-11 phone line from the back of the modem to a wall jack.

The Turbolink 1200 looks like a Hayes with its eight identical LED lights and sturdy steel construction. A DIP switch block inside the front panel is nearly identical to that of the Hayes. Only one telephone jack

PC MAGAZINE FACT FILE

**Worthington-Babcock Inc.**
4875 SW 19th Dr
Portland, OR 97201
(800) 237-9111
(503) 245-8102

*Poor performance devalues the Turbolink's $149 bargain price tag.*

**Worthington-Babcock Turbolink 1200**
**List Price:** $149, with serial cable, *Reach-Out* communications software, access to company BBS, and free on-line offers with national data services, $179
**Requires:** Serial cable, communications software.
**In Short:** An external Hayes-compatible 300/1,200 bps modem that, in its present incarnation, is fatally flawed by poor line-noise resistance.
CIRCLE **544** ON READER SERVICE CARD

is built in the back of the Turbolink 1200, so in order to have a telephone connected to the modem line I had to use a Y-jack-connector, available at Radio Shack for a buck or two. To use the Turbolink 1200 on a multiline jack, Switch 7 on the DIP switch block has to be flipped down. This is a minor pain, but the DIP switch block is located in the front near the LED, so nothing has to be taken apart except the front panel, which is easily pried off with a screwdriver.

The Turbolink 1200's speaker is loud enough to wake up an entire office but is adjustable by a volume knob on the back. At the heart of the Turbolink 1200 is a Taiwanese chip set on a GBC board. The documentation is adequate and well organized.

Hayes compatibility aside, Turbolink 1200's big problem is that it doesn't work very well. When I made it dial a local bulletin board system, it connected okay and transferred ASCII files with only a few lost characters. But when I tried a binary file transfer using Xmodem, the Turbolink 1200 could never bring the file across the wires before it failed.

**DO I HEAR A WALTZ?** Worse yet, I could hear WHLI (1100 on your AM dial) playing "The Music of Your Life" from Hempstead, Long Island, through the modem speaker. This poor resistance to line noise could be one reason why the Turbolink 1200 has one of the worst performance records in PC Labs modem testing. The PC Labs torture kings tried transferring files with the Turbolink 1200 on a good, average, and poor telephone line. On the good and average lines, the Turbolink 1200 was half as resistant to line noise as the Hayes Smartmodem and only one-quarter as resistant as the best contenders. On the poorest-quality phone lines, it pooped out completely, failing file transfers across the board.

The Turbolink 1200 was half as resistant to line noise as the Hayes Smartmodem.

I called Worthington-Babcock to ask about the music in the modem, and the company said that it had noticed music coming from the Turbolink 1200s around the office in Portland but attributed it to the number of radio transmitters nearby. "There are three up on the hill here. If you even pick up the phone, you're going to get music," said one official. He added that the company hadn't had any complaints about the Turbolink 1200 since its introduction, but it would look into the line-interference problem.

The Turbolink 1200 is attractively priced at $149, and perhaps Worthington-Babcock will see fit to improve the modem's line-noise resistance. But for now, I have to give it a thumbs-down.

**—Chris Johnston**

## Zoom Telephonics Inc.

Rather than make just another ordinary modem, Zoom Telephonics has made a modem to which you can add all sorts of options and special features. Depending on the ones you select, the Zoom Modem can take the form of one of four models: 1200 ST, 2400 ST, and an XL version of each that includes extra features.

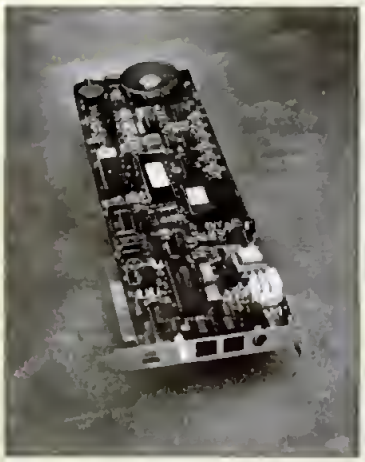
The most significant of the Zoom Modem's options is the ability to upgrade a 1,200-bit-per-second model to 2,400 bps. Other features, including those available in the XL models, consist of a real-time clock, "Demon Dialer," call progress monitoring, DTMF (Touch-tone) decoding, and a buffer for incoming data.

The Zoom Modem is a full-length card with a piggyback card for the 2,400-bps option. It can be addressed as COM1 through COM4, although most software supports only COM1 or COM2. Its various functions are set up using both jumpers and DIP switches. The procedure is well documented in the manual, which includes an appendix called "In a Rush."

You can dial all 16 DTMF codes, including A)D; hence the Zoom Modem can be used to "Demon Dial" (repeatedly dial until a ring is detected) on Autovon or other proprietary systems that use these tones. You can also insert hook switch flashes and codes that detect dial tone, ringing, or the 400-Hz tone used by MCI and other long-distance carriers for you to dial your access code. These options allow you to use the special features of your PBX or speed-up your call by obliterating the normal pauses. The Zoom Modem will also

### PC MAGAZINE FACT FILE

**Zoom Telephonics Inc.**
207 South St
Boston, MA 02111
(617) 423-1072



*The Zoom Modem's real attraction is its versatility.*

**Zoom Modem 1200 ST**
**List Price:** $199; XL model with clock, buffer, and other options, $229.
**Requires:** One full-length slot.
**In Short:** A respectable performer at an attractive price, the Zoom Modem 1200 ST offers many special features, plus the ability to upgrade to 2,400-bps operation.
CIRCLE **468** ON READER SERVICE CARD

**Zoom Modem 2400 ST**
**List Price:** $319; XL model with clock, buffer, and other options, $349
**Requires:** One full-length slot.
**In Short:** The 2,400-bps version of the Zoom Modem has all the same features as the 1,200-bps model, plus improved 1,200-bps performance.
CIRCLE **469** ON READER SERVICE CARD

# Next to your computer,

# nothing beats a Tandy® printer

### IBM® PC compatible

For the best value and selection in top-quality printers, shop your local Radio Shack Computer Center. We've got what you need, whatever your printing requirements.

### Versatile business printer

The DMP 2200 (26-1279, $1695) provides dot-matrix printing at up to 380 characters per second. Supports elongated, double-high, bold, underline, super/subscripts, italics, double strike and bit-image graphics.

### Customized type styles

Use the Font Editing Packages (sold separately) to load different type styles for print quality that rivals a daisy wheel. In the draft mode, the DMP 2110 (26-2810, $1295) prints up to 240 characters per second.

### Low-cost business printer

The DMP 430 (26-1277, $699) allows a choice of micro, italic and double-high fonts, as well as bit-image graphics. Prints up to 180 characters per second.

### Letter quality daisy-wheel printers

The DWP 520 daisy-wheel printer (26-2800, $995) provides a clean, crisp, "electric-typewriter" look at up to 500 words per minute.

And for letter-quality printing under $400, the DWP 230 (26-2812, $399.95) is the clear choice.

See our complete selection of printers today.

**Send me an RSC-17B Computer Catalog.**
Mail To: Radio Shack, Dept. 87-A-1182
300 One Tandy Center, Fort Worth, TX 76102

Name _____
Address _____
Company _____
City _____
State _____ ZIP _____
Phone _____

**TANDY COMPUTERS: In Business . . . for Business™**

Radio Shack®
COMPUTER CENTERS
A DIVISION OF TANDY CORPORATION

Prices apply at Radio Shack Computer Centers and participating stores and dealers. IBM/Registered TM International Business Machines Corp.

CIRCLE 299 ON READER SERVICE CARD

# COMMUNICATIONS SOFTWARE: PICKS AND PANS

Although a small number of the modems in our survey come bundled with a communications software package, the majority do not, leaving it up to you to decide which program you want to use to run your modem.

Last year, we conducted an extensive review of 34 top modem programs, ("Asynchronous Communications: Shopping for Software," *PC Magazine*, Volume 5 Number 18). The Editor's Choices we named then—*Relay Gold*, *Ascom IV*, *Microsoft Access*, and our runners-up *PC Talk III* and *Hyper Access*—remain excellent selections to keep in mind as you hunt for the right program for your needs.

*Relay Gold*, from VM Personal Computing, is a comprehensive and powerful communications program that includes a script language, an applications program interface, background file transfers (see "Background Communications: Invisible E-Mail" in this issue), and mainframe communications capabilities. Its less powerful sibling, *Relay Silver*, offers essentially the same capabilities without the mainframe communications option and costs $100 less than the $250 full-blown *Relay Gold*.

Dynamic Microprocessor Associates' *Ascom IV*, at $195, isn't as easy to use as *Microsoft Access*, but its range of features is wider than most users are ever likely to need. It is menu driven, but command mode gives power users free reign, and it includes remote operation, bulletin board, and unattended operation abilities.

Hilgraeve's $149 *Hyper Access* was an Editor's Choice runner-up, because of its easy-to-use menu structure and powerful programming features.

If you spend most of your communications time with on-line databases, *Microsoft Access*, $200 from Microsoft Corp., is a good choice. It is an extremely easy program to use but has most of the powerful features, like a script programming language and customizable menus, that you'd expect from $200 software. But like some other Microsoft products, it's no speed demon.

For the user who wants to stick to the basics, nothing could be simpler than *PC-Talk III*, $35 from The Headlands Press, a classic program that can accomplish most communications tasks. The program, which has been around in various incarnations since 1982, is starting to show its age, but it remains an excellent no-frills choice.

Along with *PC-Talk*, the two best-known communications programs are Microstuf's *Crosstalk XVI* ($195), Version 3.6, and Hayes Microcomputer Associates' *Smartcom II*, $149 or $50 to $75 when bundled with Hayes internal modems.

*Crosstalk*, which first gained popularity in its CP/M version and is now a favorite in the MS-DOS environment, includes a more than adequate script feature and other powerful capabilities, but it, too, is getting a bit long in the tooth. Many users find its menu screen overly complex. A higher-end package, *Crosstalk Mark IV*, has been in vapor for

## PC MAGAZINE FACT FILE

***Ascom IV***
Dynamic Microprocessor Associates Inc.
545 Fifth Ave.
New York, NY 10017
(212) 687-7115
**List Price:** $195
**Requires:** 256K RAM, one disk drive, DOS 2.0 or later.
**Not copy protected.**
CIRCLE **630** ON READER SERVICE CARD

***Crosstalk XVI***
Microstuf Inc.
1000 Holcomb Woods Pkwy., #440
Roswell, GA 30076
(404) 998-7798
**List Price:** $195
**Requires:** 128K RAM, DOS 1.25 (limited use) or DOS 2.0 or later (full use).
**Not copy protected.**
CIRCLE **626** ON READER SERVICE CARD

***Hyper Access***
Hilgraeve Inc.
P.O. Box 941
Monroe, MI 48161
(800) 826-2760
**List Price:** $149
**Requires:** 192K RAM, one disk drive, DOS 2.0 or later. Hard disk recommended.
**Not copy protected.**
CIRCLE **628** ON READER SERVICE CARD

***Microsoft Access***
Microsoft Corp.
16011 NE 36th Way
P.O. Box 97017
Redmond, WA 98073
(206) 882-8080
**List Price:** $200
**Requires:** 256K RAM, two disk drives, DOS 2.0 or later. Hard disk recommended.
**Not copy protected.**
CIRCLE **627** ON READER SERVICE CARD

***PC-Talk III***
The Headlands Press
P.O. Box 862
Tiburon, CA 94920
(415) 435-0770
**List Price:** $35
**Requires:** 64K RAM, one disk drive, DOS 2.0 or later.
**Not copy protected.**
CIRCLE **626** ON READER SERVICE CARD

***ProComm***
PIL Software
P.O. Box 1471
Columbia, MO 65205
(314) 449-9401
**List Price:** $25, voluntary (shareware).
**Requires:** 64K RAM, one disk drive, DOS 2.0 or later.
**Not copy protected.**
CIRCLE **625** ON READER SERVICE CARD

almost 2 years. When it finally sees the light of day, it should give the *Relay Gold* people a run for their money.

*Smartcom II* is proof that Hayes should stick with what it knows best—hardware. This program suffers from a tedious user interface, the inability to drop down to the command level and issue straight AT commands to the modem, and the lack of a powerful script language. Hayes sells *Smartcom* for $149; modem buyers save about $80 by buying it bundled with Hayes modems. But for that $80, you'd be better off paying for something like *ProComm*.

*ProComm* is a bulletin-board shareware program (there's a $25 voluntary fee) from PIL Software. In its latest release, Version 2.3, *ProComm* is so straightforward and so complete that it was named one of *PC Magazine*'s best products of 1986 ("The Best of 1986 (And Some of the Worst)," *PC Magazine*, Volume 6 Number 1). Much of the program's command structure is similar to *PC-Talk II*, and it has a powerful script language. *ProComm* may be all many will ever need.—**Donald P. Willmott**

***Relay Gold***
***Relay Silver***
VM Personal Computing
41 Kenosia Ave.
Danbury, CT 06810
(203) 798-3800
**List Price:** *Relay Gold*, $250; *Relay Silver*, $150.
**Requires:** 256K RAM, one disk drive, DOS 2.0 or later.
**Not copy protected.**
CIRCLE **624** ON READER SERVICE CARD

***Smartcom II***
Hayes Microcomputer Products Inc.
P.O. Box 105203
Atlanta, GA 30348
(404) 441-1617
**List Price:** $149
**Requires:** 192K RAM, one disk drive, DOS 1.0 or later.
**Not copy protected.**
CIRCLE **623** ON READER SERVICE CARD

"Demon Dial" a number and signal through its speaker when it has completed a call. Some people will find this more convenient than having *SideKick* redial.

The Zoom Modem turned in a respectable performance in the PC Labs benchmark tests, having real trouble only on the worst-case line when tested without the 2,400-bps option. Performance at 1,200 bps was improved by the addition of the 2,400-bps option. This follows the general trend that 2,400-bps modems perform better at 1,200 bps than do 1,200-bps modems. Other special features include audio input and output jacks so you can record the signals from your phone line or add a separate outside audio signal such as background music or a voice synthesizer. However, the Zoom Modem does not provide a tone every 15 seconds, which is legally required to inform callers you are recording their calls.

**DTMF DECODER** Optional features include a battery backed-up real-time clock, DTMF decoder, and RAM buffer. The DTMF decoder could be used on PCs with home security or process control systems to allow them to be reset from a tone telephone; the modem can also require a Touch-tone password to be entered before it sends carrier in the auto-answer mode. The RAM buffer, either 8 or 32K, can be used to receive short electronic-mail messages without disturbing the program running on your PC.

The Zoom Modem includes a disk with several utility programs, including a memory-resident Demon Dialer, a configuration program, and a program to dump the RAM buffer. Its usefulness would be greatly enhanced, though, by the addition of an answerback feature that would allow use of ITT or some other telex service.

The Zoom Modem is a respectable performer at an attractive price; this, combined with all its special and optional features, makes it attractive to users who need one or more of those features or just want total control. The ability to upgrade to 2,400 bps is a nice option because it gives you improved 1,200-bps performance, and because it allows high-speed transmission without the usual stiff price tag for 2,400-bps modems.
—**Howard Marks**

## PC MAGAZINE EDITOR'S CHOICE

- **Multi-Tech MultiModem224E**
- **Prentice PopCom C150**
- **Racal-Vadic Maxwell 2400VP**

*At least half of the 87 modems we tested wouldn't embarrass you or your company if you bought one. Many are competent performers with good Hayes compatibility.*

*Prentice Corp.'s internal 1,200-bit-per-second PopCom C150 wins the prize for sheer performance in our PC Labs line-noise immunity tests. With scores significantly better than any other modem, either 2,400 or 1,200 bps, the Prentice modem is the one to choose for error-free communications. At $445, it's moderately priced, though not cheap for a 1,200-bps unit.*

*For a high-performing 2,400-bps modem with a slew of extras, check out Multi-Tech System's MultiModem224E. The $649 modem features an internal phone directory and built-in MNP error correction.*

*With its Maxwell 2400VP, modem veteran Racal-Vadic proves it's still a force to be reckoned with. The 2400VP offers great performance, full Hayes ATPlus command compatibility, and advanced features like error correction and an internal dialing directory. Its $595 price tag makes it competitive, too.*

*No modem summary would be complete without a word about the Hayes products. They're well built, solid, and, obviously, Hayes compatible. But in the same way that you pay extra for the IBM nameplate, you'll pay plenty for a Hayes. Its external 2,400-bps model lists at $899—that's $300 more than the Racal-Vadic 2400VP—and it doesn't include error correction or some of the other neat features you'll find elsewhere. Still, no one ever got fired for buying Hayes . . . .*

# FEATURES STANDARD WITH US, OTHERS DON'T EVEN OFFER AS OPTIONS.

Take our ARC Turbo 12, for example.

Take its speed. The fastest off-the-shelf AT™ compatible you can buy. (12.5 MHz, 50% faster than IBM.™)

Take the ARC Turbo 12's exclusive MIPS Meter,™ which gives you a digital read out of the actual number of millions of instructions per second currently being processed.

And take ARC's unmatched reliability. Which is what you'd expect from one of the fastest growing computer manufacturers.

We back our equipment with a two-year limited warranty, the longest in the industry. Each unit also comes with 90 days of *Free* on-site service. And our technical support Hot Line gives you direct access to our expert staff.

Ask your ARC Authorized Dealer for all the details. (For a list, call 800-654-6151.)

It's a fast world. With ARC, it won't pass you by.

In California call (213) 265-0835

ARC American Research Corporation

CIRCLE 327 ON READER SERVICE CARD

# TAPPING INTO ON-LINE KNOWLEDGE

For the professional researcher and casual user alike, on-line databases are a valuable resource for information on everything from airline schedules to zinc prices. With nearly 3,000 such databases accessible by PC, the question becomes not *whether* you can find what you need, but *where* to look. In this section, we begin with a survey of the popular services with details on how much they cost, what they contain, and what they're like to use.

Once you've found the databases you want, you might need some help navigating through their complex structures. That's where search software packages like the ones reviewed in this section can help. Like research assistants, these programs help you plan a search strategy that gets you the information you need, and quickly. And by cutting down access time, they can save you money, too.

If you're interested in participating in one of the on-line SIGs (special interest groups) offered by CompuServe and other on-line services, have a look at two programs designed to simplify bulletin board access and message exchange.

So plug in your modem, boot up your software, and go on-line.

Illustration Chris Spollen

# *On-line Databases:* DIALING FOR DATA

*With a little help from a modem and a telephone line, any PC can tap the vast resources of thousands of on-line databases. Each service, however, has its strengths and weaknesses. So before you log on, it's important to decide exactly what you want from your on-line sessions.*

Remember the hours spent half asleep in the college library? The midnight oil burned to verify an obscure reference? The frustration of trying to prepare a business report without even an encyclopedia for reference?

No more! At last count there were nearly 3,000 on-line databases, covering virtually any topic you can imagine. All you need is a personal computer, a modem, and a telephone.

Now, without leaving your home or office, you can scan electronic versions of popular encyclopedias, study Books in Print, search The Reader's Guide to Periodical Literature, check the weather report for nearly any area, read the latest news, obtain stock quotes, buy stocks, review airline schedules and book your tickets, exchange instant mail, chat with people all around the world, share computer software, browse through electronic shopping malls, and find help for nearly any problem that you can think of.

Much of the data available on-line was originally gathered for a specific application, and the organization it was gathered for helps amortize the maintenance costs by selling the information to others. Sometimes this information is offered to outside users directly, but usually it's more cost effective to supply only the data and let someone else handle the technical and bookkeeping chores.

This facilitating role is the service that many database companies assume. Dialog, Vu/Text, and Infomaster, for example, accept data from a variety of sources and make it available through their own storage and communications facilities. Dialog offers access to more than 250 databases from third-party collectors, supports electronic mail among Dialog users, and offers gateways to standalone services such as the Official Airline Guide (OAG). In the case of OAG, Dialog does not store the data itself but rather gives access to it through Dialog facilities. Gateways to the OAG, Dow Jones News/Retrieval, and other "volatile" services such as these are commonly offered by a variety of on-line companies.

**TYPES OF SERVICES** The range of services offered on-line is extremely broad. No one company offers everything, but the variety available from some information vendors is truly amazing. Others specialize in a narrow list of offerings but make in-depth services available in the areas they address.

For the most part it is difficult to categorize these companies because they support many of the same sources and services. Each on-line vendor has one or two things it does best, however, even though it may offer other facilities and services.

Basically there are three major types of service: communications, database, and videotext. Communications-oriented services such as MCI Mail and EasyLink offer electronic mail, message, bulletin board, and some gateway services, all primarily for business users. Database services such as Dialog, Vu/Text, and BRS store an array of data, ranging from books in print to census bureau information to magazine bibliographies. These services are generally targeted at business or academic researchers. In contrast, videotext services such as The Source, Delphi, CompuServe, and GEnie support a variety of database, communications, shopping, game, and miscellaneous services usually targeted to home or education users.

**CHOOSING ON-LINE SERVICES** The first step in selecting an on-line service is to decide what you want it for. If you need to monitor fast-breaking news for business or research, then a service like NewsNet or Dow Jones News/Retrieval is the obvious choice. If you need primarily current or historical data about a wide variety of topics, then one of the research databases such as Vu/Text or Dialog may be the answer. For general-purpose on-line access, consider a videotext service such as CompuServe or Delphi.

Note, too, that you can usually cross over from one type of service to another. Delphi, for example, offers a Dialog gateway for occasional research. Be aware, however, that the charge for this service is $.35 per minute in addition to Dialog search charges, which average about $1 per minute. Although there is no minimum usage or monthly membership charge for Dialog, you might still elect to pay Delphi's premium rates simply to have a single billing source. If you use Dialog regularly, however, apply for your own Dialog account.

Another example is the Dow Jones News/Retrieval service, well known for supplying stock exchange quotes and fast-breaking news information. You can sign up with Dow Jones for the news service, or you can access it through MCI Mail, CompuServe, and other vendors. Multiple access to databases is common in the electronic information industry, and if you can get all or most of your needs met from a single source, the sign-up, log-on, and billing processes are less troublesome.

However, be sure to study the billing options offered by the service under consideration. Some companies offer only

major credit card billing, while others issue direct monthly statements to businesses or allow automatic bank transfers.

What service your associates and colleagues are using may also influence your decision. If you are trying to decide between two videotext services, for example, the one that most of your acquaintances are using may be the best choice because you could also use it to access them directly via electronic mail and real-time communications services.

**SOME POPULAR SERVICES** We have profiled a few of the more-popular on-line vendors below to give you an idea of the range of services they offer, along with some specific information about them.

We have assumed 1,200-bit-per-second access to these services, even though most on-line information is available at 300 bps at a slight cost reduction.

## BRS/After Dark BRS/Brkthru BRS/Search Service

BRS (Bibliographic Retrieval Service), from BRS Information Technologies, offers more than 125 databases, ranging from Academic American Encyclopedia and American Banker through Work/Family Life Database. It contains many of the same sources that you will find in Dialog. Generally, BRS charges a little more for on-line time than Dialog does, but viewing and printing records costs less. The BRS price structure is one of the more difficult to decipher, but it offers a lot of options. There are three costs involved in using BRS: telecommunications (Telenet, Tymnet), the BRS search fee, and the database royalty. The royalty fees average $1 per minute, and the BRS fees range from $.06 to $.58 per minute, depending on which usage plan you select. The lowest rates are available to users who can commit to a specified number of hours of usage each year.

BRS offers a variety of services with different coverage and costs. Users accustomed to command-driven software will appreciate the direct access to a variety of databases, search strategies, and reporting features offered by BRS/Search Service.

As a single source for on-line information, CompuServe or one of the other videotext services is a good choice.

Users more comfortable with menu-driven software but who still require business-hour searching of major databases may select BRS/Brkthru. This service offers virtually the same coverage as does BRS/Search Service, plus the convenience of menu-assisted searching.

A somewhat limited menu structure is also available through BRS/Search Services. You can access it by entering the Menu command at the system prompt. This ability to switch between command-oriented and menu-oriented access is convenient, especially when you haven't used the service in a while. You can use the menus to refresh your memory on the commands and structure of BRS before returning to the command mode.

BRS/After Dark, a subset of the BRS database, is offered after business hours at a substantial cost savings. It contains about 35 of the most popular BRS databases.

## CompuServe

Many users erroneously believe that CompuServe is intended mostly for hackers and home users. While this association may have been at least partially accurate a few years ago, CompuServe has since expanded its services and enhanced its image. Now business, education, professional, and home users enjoy the benefits of CompuServe's varied offerings. As a single source for on-line information, CompuServe or one of the other videotext services is a good choice.

Established in 1969, CompuServe (the company name is the same as that of the database) is at least 10 years older than similar services. The company's approach to services and support is professional. Services range from bulletin board and database offerings to electronic mail, shopping, reference, and special interest groups.

CompuServe's Executive Information Service helps separate business offerings from general videotext services. Subscribers to EIS can select from a variety of financial and business tools, including tax and stock information, electronic conferencing, news, and travel services. CompuServe also offers gateways to other popular on-line services such as MCI Mail, telex, and the Official Airline Guide.

CompuServe uses a combination of menus and direct commands. You can always step through a menu tree to get to the areas you want to access, or you can issue direct GO commands at any system prompt. GO OAG, for example, will connect you to the Official Airline Guide, and GO IBM will lead you to the IBM PC special interest group.

Apart from the encyclopedias, shopping, and other database services, one of the most interesting aspects of CompuServe is its direct access to other users through three different types of messaging. First, using CB simulation, you can chat in real time to users from nearly everywhere about almost anything. Second, you can use CompuServe's electronic mail facility to leave messages for other users in their mailboxes.

Still a third kind of on-line messaging, available in the various interest groups, allows you to post bulletins or questions to individuals or to the group at large. When you log on later, you may find that several people have responded to your message. Many users use this facility for on-line sales prospecting, to find help for hardware or software problems, or to share ideas on hobbies and business subjects.

## Delphi

Every database has its own personality, distinct and identifiable. Delphi's personality is friendly. Like the new acquaintance that makes you feel at home the first time you visit, Delphi, from General Videotext Corp., is fun to get to know. You can even sign up for Delphi services on-

# "Ordinary online services left me flat..."

$10.00+ per hour

# "With GEnie™ I discovered vast new horizons."

$5 per hour

There's only so far you can go with most ordinary online information networks. But with GEnie—the General Electric Network for Information Exchange—there's virtually no end to the exciting new interests you can explore. Discover the value of GEnie's vast range of services and explore new territory with guides from our Special Interest Groups.

Join the friendly crew with GEnie's IBM† ***RoundTable™ Special Interest Group*** for exciting and informative discussions. Benefit from the expertise of experienced individuals. Compare notes on hardware, software, games or any other topic you choose. And, for the simple cost of down-loading, collect thousands of valuable public domain software programs for your personal computer. Over 1000 new programs are added to our libraries every month. And remember, UPLOADS ARE FREE on GEnie!

**No extra charge for 1200 Baud.**

Make new friends, schedule meetings, gather facts and figures, set up travel plans, get the news, be entertained and even shop online for a fraction of what other information services charge, because GEnie's non-prime rate for 300 or 1200 baud is only $5 an hour. GEnie always comes out ahead of the competition in savings, in some cases by as much as 60%.

**You get even more for your money.**

In addition to user support groups, you can meet new people with ***GEnie's Live Wire™ CB Simulator.*** Exchange messages with ***electronic mail*** service. Find the best vacation deals and make your reservations with ***American Airlines travel service.*** Shop at home with ***American Express Merchandise Shop.*** Learn the fun way with a subscription to ***Grolier's electronic encyclopedia.*** Play classic and ***multiplayer games.*** Use GEnie's ***Financial Services*** to track stock market quotes, check market indicators and maintain an automatically updated personal portfolio online. All this ***plus*** new services added each and every month!

Map out your own voyage of discovery with GEnie as your guide...enrich your tomorrows by signing on with GEnie today.

**Backed in the GE Tradition**

GEnie is brought to you by General Electric, whose reputation is built on attention to detail and customer satisfaction. We're continuing that tradition with GEnie.

| Compare & Save* | Services | | | | | | Pricing | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Travel & Shopping | SIGs/User Groups | CB & Mail | Financial Services | News | Games | Registration Fee | Monthly Minimum | Non-prime time rates 300 baud | Non-prime time rates 1200 baud |
| The Source | X | X | X | X | X | X | $49.95 | $10.00 | $8.40 | $10.80 |
| CompuServe | X | X | X | X | X | X | $39.95 | none | $6.00 | $12.50 |
| **GEnie†** | **X** | **X** | **X** | **X** | **X** | **X** | **$18.00** | **none** | **$5.00** | **$5.00** |

*Basic rates and services shown in effect 2/87. †Non-prime time applies Mon.–Fri., 6pm–8am local time, all day Sat., Sun., and mail holidays. Subject to service availability. Additional charges apply for 2400 baud and financial services.*

**Sign up from your keyboard today.**
**4 Easy Steps:**

1. Have your major credit card or checking account number ready.
2. Set your modem for local echo (half duplex)—300 or 1200 baud.
3. Dial **1-800-638-8369.** When connected, enter HHH
4. At the U#= prompt enter **XJM11880,GEnie** then RETURN.

Need help or more information? No modem yet? We can help. In U.S. or Canada call **1-800-638-9636.**

GEnie™

Stay online longer, for less.

GE INFORMATION SERVICES

General Electric Information Services Company, USA

GEnie rates and services subject to change. Uploads are free during non-prime hours at 300 or 1200 baud. Some services offered on Genie may include additional charges.

† *IBM is a registered trademark of International Business Machines*

CIRCLE 247 ON READER SERVICE CARD

line with your first telephone call, so there is no waiting for access once you have selected Delphi.

The Delphi Advantage discount membership plan extends reduced rates to users who can commit to at least $24 per month in on-line charges.

Newer than companion videotext services like CompuServe and The Source, Delphi has a slimmer list of offerings, but it is growing faster than the others.

Delphi stores more than 65 databases directly and allows subscribers access to Dialog Information Services offerings for a $.35-per-minute surcharge. Other specialty services that Delphi makes available include Grouplink and Global Venture Network.

Grouplink is a customized wide-area network for user groups that offers conferencing, bulletin board, file transfer, and other services. It can be private, available only to employees of a particular company or any other designated group, for example, or it can be accessed through the special interest section of Delphi, which makes it a public offering. A one-time fee of $5,000 is required to establish a Grouplink network.

Global Venture Network is a special interest group designed to connect entrepreneurs with venture capitalists.

A combination of menus and English-like commands makes Delphi easy to navigate. The menus are easy to interpret, and on-line help is available by entering a question mark at any menu.

## Dialcom

Dialcom, from Dialcom Inc., began in 1970 as a regional electronic mail service and computer link. From there the company expanded into other cities and overseas. Gradually, database access was added,

# ON THE PARTY LINE: PACKET SWITCHING

Where on-line services are concerned, there are many roads to the same destination. Although some services use private roads in the form of direct, dial-up access, most elect to use public transportation. They provide access to their data and service via such packet-switching services as Tymnet, Telenet, or others.

These public networks handle all of the details of maintaining local nodes to attach individual users to the various services. This arrangement lets the data and service vendors concentrate on what they do best without having to worry about the details of connecting users.

By using third-party communications services, the on-line vendors also can offer more nodes with local access numbers than they could offer alone.

In effect, the packet companies serve as a broker between you and the on-line services you want to access. That means you have broader options for access, and it reduces the number of telephone numbers and access routines you have to remember. Most users can access all of the on-line services they need from one or two local or area packet nodes.

The procedure for signing on to a particular service is to dial the telephone number of the local node, sign on to the network, then request the specific service you want.

Once you're connected to the requested service, the log-on procedure is the same as if you had dialed the service directly. Some database and videotext services include the telecommunications costs in the price of their service, while others quote it separately. In either case, the information vendor usually bills you for the cost and pays the packet network. As an end user you rarely do business directly with the carrier.

Two of the most common services are Tymnet and Telenet. Tymnet is a McDonnell Douglas network systems company, while Telenet is a service of General Telephone. They work similarly, but each one uses a slightly different access method.

The Tymnet log-on is generally more straightforward than that of Telenet. With Tymnet you are first asked for your terminal identifier. When the system asks you to "please log in," enter the name of the service you want to access. You will be connected immediately to the requested service, and you can enter the appropriate service log-on.

There's not much difference with the Telenet procedure, except you must know the special ID number used by the service you want. As with Tymnet you are asked for your terminal type. For PC users, the response is normally a carriage return. Then you're prompted to enter the special service ID, which normally starts with the letter C and can be the name of the service or a three-digit or longer number. After the connection is established, you continue the specific service log-on procedure as usual.

### GETTING ON-LINE: THE TOOLS

To access these networks, you need a modem and terminal access software.

Although most services support a variety of data exchange rates from relatively slow to pretty fast, by far the most common rate is 1,200 bits per second (bps). Although the actual transfer method used affects the effective throughput of data at this rate, for convenience we generally translate 1,200 bps to approximately 120 characters per second. Nearly any modem you purchase today will support 1,200 bps, as well as the slower 300 bps. Equipment for 2,400 bps is also becoming popular.

To successfully connect to a packet network you must first set your modem and communications software for the proper communications speed (1,200 bps), and for the proper number of data bits, stop bits, and parity. Most on-line services support 8 data bits, 1 stop bit, and no parity, and that's the setting many users select. You may find that more reliable transmission is possible by enabling parity, however. In this case, try using 7 data bits, even parity, and 1 stop bit. These two common communications settings are usually designated as 1200 N81, for 1,200 bps, no parity, 8 data bits and 1 stop bit, or 1200 E71, when even parity is selected.—**Tom Badgett**

# Q&A™ OUR #1 RATED FILE MANAGER WAS JUST NAMED THE #1 WORD PROCESSOR.

It's a red letter day for file management . . . *Software Digest*, the independent testing service, just rated Q&A™ Version 2.0 the #1 word processor. Q&A beat the best stand-alone word processors including PFS: Professional Write, MultiMate, Microsoft Word, WordStar 2000+, and Word Perfect. Since Q&A is also *Software Digest's* #1 file manager, it becomes the only integrated software ever to be rated #1 in two categories.* And once all of you find out, we think those stand-alones could get awfully lonely.

PC MAGAZINE EDITOR'S CHOICE

Easy-to-use yet flexible file management. And fast, full-featured word processing. Q&A combines the best of both to deliver a whole new way to keep track of people and information. Manage client lists, personal databases, inventory, tax records, expenses and more. Do customer mailings, write letters and proposals, include 1-2-3 spreadsheets and graphs in documents, you name it. With our integrated personal file manager/word processor, custom form letters just don't get any easier. All this plus advanced features like The English Language interpreter and special hot-links to Lotus make Q&A the value leader in personal software. For now and as your needs grow. In both file management and word processing.†

Call today. We'll send complete information, and while supplies last, a free demonstration disk (*suggested retail $10*). #1 file management. #1 word processing. That's a two-for-one offer you can't find anywhere else.

(800) 441-7234 Ex. 111
(800) 626-8847 Ex. 111 in CA

Q&A™

*The File Manager, With a Word Processor, That Understands English*

SYMANTEC. 10201 Torre Avenue • Cupertino, CA 95014 • (408) 253-9600

*Software Digest publishes head-to-head comparison results from The National Software Testing Laboratories, an independent, non-advertising-funded organization. Q&A was ranked #1 in File Management in the February 1986 issue and #1 in Word Processing in January 1987. For complete report reprint info call (800) 223-7083 (800) 222-3315 in PA. †Call for very low-cost upgrade offers. PFS, PFS Professional Series, WordStar and RapidFile. Q&A is a trademark of Symantec Corp. Other products are trademarks of their respective holders. © 1987 Symantec Corp.*

CIRCLE 251 ON READER SERVICE CARD

# PC MAGAZINE On-line Services: Summary of Features

## ON-LINE SERVICES: AT A GLANCE

| Product | Company | Type | Target audience | No. of users | Access via |
|---|---|---|---|---|---|
| BRS/After Dark<br>BRS/Brkthru<br>BRS/Search Service | BRS Information Technologies<br>1200 Rte. 7<br>Latham, NY 12110<br>(800) 345-4277<br>CIRCLE 606 ON READER SERVICE CARD | Database | Business, education | 15,000 | Telenet, Tymnet |
| CompuServe | CompuServe<br>5000 Arlington Centre Blvd.<br>Columbus, OH 43220<br>(800) 848-8199<br>CIRCLE 605 ON READER SERVICE CARD | Videotext | General, business | More than 200,000 | CompuServe, Tymnet, Telenet, Datapac |
| Delphi | General Videotext Corp.<br>3 Blackstone St.<br>Cambridge, MA 02139<br>(617) 491-3393<br>CIRCLE 604 ON READER SERVICE CARD | Videotext | General, home, and office | 50,000 | Direct-dial (Boston), Tymnet, Telenet, Datapac |
| Dialcom | Dialcom Inc.<br>1109 Spring St.<br>Silver Spring, MD 20910<br>(301) 588-1572<br>CIRCLE 603 ON READER SERVICE CARD | Communications | Business | 180,000 | Telenet |
| Dialog | Dialog Information Services Inc.<br>3460 Hillview Ave.<br>Palo Alto, CA 94304<br>(800) 526-5050 ext. 415<br>CIRCLE 602 ON READER SERVICE CARD | Database | Business, professional, education | 70,000 | Dialnet, Tymnet, Telenet |
| Dow Jones News/ Retrieval | Dow Jones & Co.<br>P.O. Box 300<br>Princeton, NJ 08540<br>(800) 257-5114<br>CIRCLE 601 ON READER SERVICE CARD | Videotext | Business | Info. not available | Telenet, gateways through other services |
| GEnie | General Electric Information Services Co.<br>401 N. Washington St.<br>Rockville, MD 20850<br>(800) 638-9636 ext. 21<br>CIRCLE 600 ON READER SERVICE CARD | Videotext | Home PC users who access during non-prime time | 35,000 | GE Information Services teleprocessing network |
| Infomester | Western Union Telegraph Co.<br>One Lake St.<br>Upper Saddle River, NJ 07458<br>(800) 325-6000<br>CIRCLE 548 ON READER SERVICE CARD | Database | Business, libraries, information specialists | Info. not available | Western Union, Tymnet, direct-dial WATS |
| NewsNet | NewsNet<br>945 Haverford Rd.<br>Bryn Mawr, PA 19010<br>(800) 345-1301<br>CIRCLE 549 ON READER SERVICE CARD | Database | Business, professional | 13,000 | Telenet, Tymnet, direct-dial WATS |
| The Source | Source Telecomputing Corp.<br>1616 Anderson Rd.<br>Maclean, VA 22102<br>(800) 336-3366<br>CIRCLE 547 ON READER SERVICE CARD | Videotext | Business, professional, home | Info. not available | Sourcenet, Telenet |
| Vu/Text | Vu/Text Information Services Inc.<br>1211 Chestnut St.<br>Philadelphia, PA 19017<br>(800) 258-8080<br>CIRCLE 546 ON READER SERVICE CARD | Database | Business, government, professional | 20,000 | Telenet, Tymnet |
| Wilsonline | H.W. Wilson Co.<br>950 University Ave.<br>Bronx, NY 10452<br>(800) 622-4002<br>CIRCLE 545 ON READER SERVICE CARD | Database | Education, libraries, business | Info. not available | Telenet |

## ON-LINE SERVICES:

| Product | Registration fee |
|---|---|
| BRS/After Dark<br>BRS/Brkthru<br>BRS/Search Service | $75/year; $75 one-time fee for Brkthru and After Dark; $35 fee for additional passwords under one account; optional annual minimum agreement can lower rates to as little as $.07/minute |
| CompuServe | $39.95 one-time fee |
| Delphi | $49.95 one-time fee, including handbook and 2 hours of usage time |
| Dialcom | Info. not available |
| Dialog | None. Business Connection, $145 including software and $100 free connect time. Knowledge Index, $35 |
| Dow Jones News/ Retrieval | None, available through other services |
| GEnie | $18 one-time fee |
| Infomester | $25 one-time fee |
| NewsNet | $15/month or $150 year; corporate discounts available for 7 or more accounts |
| The Source | $30 one-time fee; $45 with user manual |
| Vu/Text | Info. not available |
| Wilsonline | Info. not available |

## COST COMPARISON

| Basic on-line costs | Other costs |
|---|---|
| $50/year, plus $.58/minute and database royalty fee averaging $1/minute, $10 to $ 52/minute for After Dark with $12/month minimum | Database document, $.03 to $28 each; telecommunications charge, averaging $ 15/minute; Brkthru menu service billed at varying hourly rates |
| Standard, $.21/minute; prime, $ 25/minute | Telecommunications charges; surcharge for 4,800-bps or 9,600-bps access; EIS upgrade, $10, plus $10/month minimum on-line usage fee |
| Standard, $.12/minute; prime, $.29/minute; no surcharge for 1,200-bps or 2,400-bps access | Charges higher from Alaska, Hawaii, Puerto Rico, and Guam; additional charges for Official Airline Guide and Dialog services |
| Wide range depending on accessed database | Info. not available |
| $1/minute average; Business Connection and business databases, $1.40/minute; reduced evening service of Knowledge Index, $.40/minute | Surcharge on some databases for displaying found records, surcharge on Business Connection for displayed records; Dialmail electronic mail service, $.20/minute |
| Standard, $.10 to $1.76/minute, prime, $ 30/minute and higher | Surcharge for some services; real-time stock quotes, $18.50/month; Dow Jones Tracking Service, $5/month; Investor's Express Account, $8/month; QuickSearch company reports, $2 to $39 each |
| Standard, $.08/minute; prime, $.58/minute; at 2,400 bps: standard, $.25/minute; prime, $ 75/minute | Hard-copy electronic mail, $2 for first page and $.75 for each additional page |
| $.15/minute | $8 for each successful search |
| Standard, $.60/minute; prime, $.80/minute | Surcharge for found records; NewsFlash hits, $.37 each, TRW Reports, $29/report; direct billing business accounts, $25 one-time application |
| $10/month or $95/year minimum usage; standard, $ 18/minute; prime, $.43/minute | Telecommunications charges; surcharge for 1,200-bps and 2,400-bps access; surcharge for access from Alaska, Hawaii, and Canada |
| $75 to $100/hour | $ 15/minute for telecommunications; $10/month for Option II subscription |
| $.17/minute without database connection | Surcharge for each database searched, varies by database; telecommunications charges |

## ON-LINE SERVICES: SUPPORT FEATURES

| Product | Documentation | Support | Software |
|---|---|---|---|
| BRS/After Dark<br>BRS/Brkthru<br>BRS/Search Service | Basic user instructions; optional Search Service user manual; optional database guides; *BRS Bulletin* magazine | Full- and half-day training seminars, $55 to $95 each; special training for individual databases; toll-free telephone support | None |
| CompuServe | User guide, $12.95 | *Online Today* magazine; *Update* monthly newsletter | None |
| Delphi | User handbook; quick reference card | Telephone support; response to questions and problems by electronic mail | None |
| Dialcom | Info. not available | Info. not available | Info. not available |
| Dialog | User guide, $50; database directory and summary updated monthly; *Chronolog* monthly magazine; periodic printed tutorials on Dialog usage | Orientation courses; user training and seminars, $55 to $125/day; monthly free database searches | *Dialog Communications Manager* communications software, $95; *Dialoglink Account Manager*, $45 |
| Dow Jones News/Retrieval | User manual | On-line help; on-line news and reference newsletter; *Intro*, a free subscriber newsletter | *The Market Analyzer*, $349; *The Market Analyzer Plus*, $449; *The Market Manager Plus*, $299 |
| GEnie | User guide; on-line files | *Inside the Lamp* quarterly newsletter; *GEnie LiveWire* monthly newsletter; toll-free telephone support; pocket reference guide | None |
| Infomaster | User guide; *InfoMaster Today* newsletter | On-line help, training courses; on-site visits | *IMM* message and communications software, $150 |
| NewsNet | User manual; *Guide to News on NewsNet* directory; *NewsNet Mini Guide*; quick reference card | On-line help; special interest booklets, *NewsNet Action* newsletter; gateways to other databases | None |
| The Source | User manual; command guide | On-line help; telephone support | *re:Source* communications software optimized for access to The Source, $89 |
| Vu/Text | User guide with tutorial; command guide; database listings and summaries | *Newsline* newsletter; toll-free telephone support; workshops, $35; on-line training databases, $5/hour | *Westmate* (optional) |
| Wilsonline | Quick reference guide; printed tutorial | On-line help; toll-free telephone support; training seminars | None |

# LIFE ON THE SIG

With about 15,000 members in its five forums (Software, Hardware, Communication, New User, and Jr), the IBM Net of CompuServe is the world's largest IBM PC user group. Its data libraries have about 80 megabytes of files: mainly programs but also some articles, software reviews, and threads of messages. Just the descriptions of the data libraries run to over 1.2 megabytes.

While the data libraries are the initial draw for many, the soul of the SIGs (special interest groups) are the message bases. There are about 500 messages left per day (about 650 on weekends), with the greatest activity—about 40 percent—on IBMSW. About 4,000 people log on to the forums in a month. Many are lurkers who skim the messages without taking part themselves. There was an especially large number of lurkers toward the end of December, when word spread that Borland's Philippe Kahn and at least four other software company presidents were getting involved. At one time the size of the message base was such that messages were saved for only 2 or 3 days, but recently the period has been extended to a week.

Much of the message activity involves roughly 300 regulars, but you shouldn't think this makes the IBM Net cliquish. On the contrary, new people are warmly welcomed. While many regulars are software developers and others who make their living from computers, the membership also includes a fire chief, an auto racing driver, an airline pilot, and a sprinkling of academics.

What gets discussed? There are, of course, some questions to the sysops about where a certain program can be located or requests for help with downloading. The major part concerns questions about software, even on IBMHW and IBMCOM, in which hardware issues are also discussed. For many serious new programs, it is likely that there are beta testers among the SIG membership, so you can learn about such programs months before magazine reviews appear. For almost any genre of software, a request for recommendations will elicit responses from people who have extensively used the programs. Especially useful are comments from people explaining why they switched from one program to another. And, unlike just reading a written review, you can question the responder further. The membership is especially strong in expertise on utilities, both those in the IBMNET data libraries and in commercial programs.

Each forum has a Village Inn section where there are discussions of issues of general computer interest. I recall a vivid thread entitled "Lotus Bullmerde" on the Lotus look-and-feel cases (*merde* is French for *manure* and was used in an attempt to get around the sysops, who try to make sure that the messages will not contain any offensive language).

This brief sketch fails to convey the tremendous sense of camaraderie on the SIGs. There is a fair amount of horsing around. Puns are especially common. A favorite was a response to a message I left concerning the "whether" in Los Angeles after someone had remarked on the snow in New York: A third member piped in with, "Barry, that's the worst spell of weather we've seen in these parts in quite a while."

**—Barry Simon**

*Barry Simon is a professor at a major research university.*

and in 1982 the firm was acquired by ITT, which expanded Dialcom's capabilities further. British Telecom bought the service early in 1986.

Although Dialcom is changing rapidly, the company's primary service consists of electronic mail and customized remote mainframe access.

Through Dialcom, businesses can establish private communications networks for sales groups, for example. Express mail service that flashes a notice on the recipient's terminal is also available. In addition, Dialcom supports the X.400 international interconnect and message transfer standard.

Companies can use Dialcom to establish private databases for in-house use, and some of them share their data with other users. The U.S. Department of Agriculture, for example, maintains a Dialcom database that is available to any Dialcom subscriber. Typical on-line services such as the Official Airline Guide, Dow Jones News/Retrieval, USA Today, plus the United Press International and Associated Press wire services are also available to Dialcom users.

Dialcom uses short, English-like commands to access various on-line features and prompts the user with a full-screen menu.

## Dialog

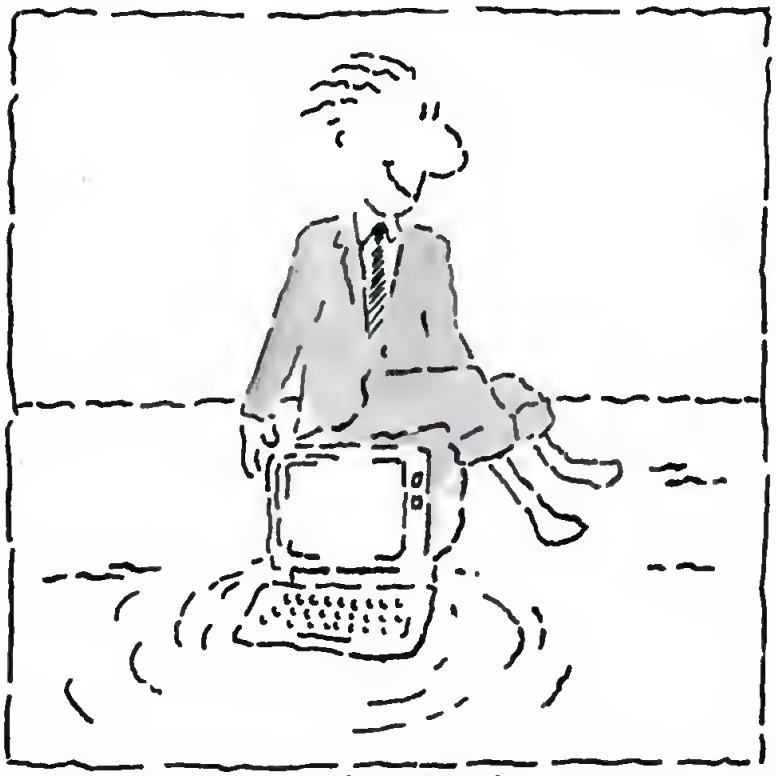
Dialog, from Dialog Information Services Inc., is one of the premier database services aimed at business, professional, and education users. The company claims to have 115 million items available on-line. Access is command oriented, but Dialog's documentation is comprehensive and the command structure is not difficult to learn. As with any on-line service, the most difficult part of using Dialog is learning how to construct a search command for maximum efficiency and cost effectiveness. Dialog training classes and documentation help.

Third-party software is available to streamline search procedures. Open monthly billing is available.

Dialog offers access to more than 250 individual databases ranging from Academic American Encyclopedia to Zoological Record. New databases are added regularly as the range of offerings changes and as users request expanded services. Among the most recent offerings are the King James Version of the Bible and British Books in Print.

These offerings join such long-term standards as Dun & Bradstreet databases and the electronic Yellow Pages.

# GET YOUR FEET WET.



**Sample Dow Jones News/ Retrieval® — the nation's premier online business and financial resource—without getting in over your head.**

For only $49.95, the News/Retrieval Membership Kit lets you and your colleagues plumb the depth of this valuable news and information service.

Eight free hours* of online time will get you started. There's a User's Guide to show you the way, step by step. And a year's subscription to *Dowline* (the magazine of News/Retrieval) gives you background on and suggested applications for our offerings.

Stay on top of the competitive situation in your industry. Check on the positions of your company and clients. Keep up with breaking news or call up past news from *The Wall Street Journal* (online exclusively with News/Retrieval) back to January 1, 1984. You can analyze a wealth of financial data, tap a pool of general knowledge, even plan a trip using almost any computer and modem, terminal or communicating word processor.

The Dow Jones News/Retrieval Membership Kit. It can help you embark on a wave of success. . .and not feel soaked.

To order or for more information, call **1-800-221-7700, Ext. 427E.** (Alaska, Hawaii and foreign, call 1-215-789-7008, Ext. 427E.)

Or use the coupon.

**YES! I WANT TO GET MY FEET WET!**

☐ **Corporate offer-$49.95 Each** includes:
• 8 Free Hours* • Multiple Passwords
• User's Guide • 1 Year of *Dowline*
• $12 Annual service fee waived for 1 year
☐ **Send more information**

☐ **Personal offer-$29.95 Each** for individual use, includes: • 5 Free Hours*
• Single Password • User's Guide
• 1 Year of *Dowline* • $12 Annual service fee waived for 1 year

$____ENCLOSED (Check/Money Order) ☐Bill me later Charge to: ☐AmExp ☐ MC ☐ VISA

(If you pay by credit card, all subsequent usage charges will be billed to your credit card.)

Card No. _____ Exp. Date_____

Signature_____

Name_____ Title_____

Company _____

Address _____

City/State/Zip _____

Daytime Phone Number _____

**Mail to: DJN/R Membership Kit, P.O. Box 300, Princeton, NJ 08543-0300**
**ATTN: John McGovern** HOPM0507E

*Per account. Limited to new subscribers only. Free time (8 hours per Corporate offer, 5 hours per Personal offer) must be used within 30 days after receipt of password(s). Certain databases have fees over and above usage charges which are excluded from free time offer.

## Dow Jones News/Retrieval®

*Fuel for your ideas.*

Copyright © 1986 Dow Jones & Company, Inc. All rights reserved. Dow Jones News/Retrieval is a registered service mark of Dow Jones & Company Inc.

A companion service to Dialog, the Knowledge Index, provides approximately 35 databases after normal business hours at reduced costs. When using Knowledge Index, you pay a single hourly fee instead of a variable fee that depends on the database being accessed, as with the standard Dialog. Knowledge Index also accepts automatic credit card billing. Another Dialog service, Business Connection, offers dedicated business databases such as corporate intelligence, financial screening, and information on products and markets. These are put together as customized packages—an idea that is becoming increasingly popular in the on-line business. The Business Connection lets you access databases that are part of the overall Dialog offering, but they are preselected for you, and the service comes with its own telecommunications software front end to make accessing data easier.

You can also purchase Dialog data on CD-ROM, an attractive alternative for libraries or other research-oriented institutions with high usage.

## Dow Jones News/ Retrieval

With Dow Jones News/Retrieval, from Dow Jones & Co. Inc., the name says it. This is first and foremost an on-line gateway to current stock and investment information. Closely related services include in-depth company reports from Disclosure, Investext, and Standard & Poor's, as well as business and general news on-line. The service has been around since 1974 and has come to be one of the on-line industry standards. The Dow Jones News/ Retrieval service is available from a variety of other services through gateways.

In addition, you can use MCI's mail service from inside Dow Jones, check the national weather, read movie reviews, and shop through an on-line store. As with most of the on-line offerings, Dow Jones is expanding beyond the initial database. The Dow Jones service is basically command driven. You can access virtually any available database or service by entering a double forward slash (//) followed by the service abbreviation.

You can also call up a series of menus to help you make a selection. Once inside a particular service, custom menus are generally available for the selected service.

By using Dow Jones or third-party software, you can integrate stock information downloaded from the on-line service with Lotus's *1-2-3* or other spreadsheet software for financial analysis. Portfolio packages can automatically log on to the service, search for specified stock information, and download the results to a local database.

## GEnie

GEnie, from General Electric Information Services Co., offers a variety of useful on-line services and joins the rest of the videotext market in waiting for the real future of this industry to open up.

GEnie (General Electric Network for Information Exchange) has an interesting history. The General Electric Information Services Co. has furnished private data communications services to GE and other large companies for 20 years or more. Unfortunately, to have enough computer and communications capacity to handle the peak loads, a company like GE has to install more facilities than it needs during the off times. With an eye toward smoothing out the use of its facilities and getting in on the perceived lucrative future of videotext, GE opened up its communications services to the public as the GEnie network.

GEnie offers videotext services at rates considerably below those of the competition.

GEnie offers typical videotext services at rates considerably below those of the competition. GEnie is newer than other players in the field, and its range of services is somewhat narrower. But it has the resources of a major company behind it, and who can say whether the experiences of its predecessors may not be in the newcomer's favor?

The mood on GEnie is friendly, with ample menu prompts and good user feedback. You can also access specific functions through commands at any menu, bypassing as many menu levels as you need.

Services include CB simulator and other conferencing facilities, shopping, software exchange, games, special interest groups, and electronic mail. A recent addition, Quick Gram service, permits GEnie members to send paper mail to nonsubscribers for an additional cost of $2 for a single page and $.75 for each additional page up to five pages. The American Express ADVANCE on-line shopping service is also available through GEnie.

GEnie and General Electric press releases are available on-line, so you can research the history of this service and its parent company.

## Infomaster

Infomaster, from Western Union Telegraph Co., offers one of the broadest selections of information of any of the on-line services because it pulls data from such vendors as Dialog, NewsNet, Vu/Text, and BRS Information Technologies, as well as selecting information directly from company databases. In all, Infomaster supports approximately 700 databases from a variety of sources. Cross-vendor searching is available with MedScan, which lets you enter search criteria and have Infomaster automatically search nearly all available medical databases to find the information you requested. Company Name Scan is a similar service that supports searches for company information across 12 databases. Western Union plans to expand this type of single-point access to multiple databases.

The Infomaster database service is accessed through EasyLink, the electronic mail and telex service, or directly via Tymnet. Users of Infomaster alone do not have EasyLink's electronic mail and telex capabilities, however.

Two levels of database access are available. Infomaster-I uses menu prompting but offers fewer databases than Infomaster-II, which is command driven. Even

# Intelligence that easily grows on you.

Telex Intelligent Workstations.

High performance microcomputers offering expandability, systems connectivity, and IBM compatibility. While they've become the standard for 3270 subsystem intelligence, that's just the beginning of where they can grow. Because now they're expandable into airline, S/3X, and PBX environments.

Whatever information worlds you are merging, let Telex Intelligent Workstations connect you to the future, today. For more information on Telex products and worldwide service and support call Telex. USA: 1-800-331-2623, Ext. 3284 (Oklahoma, 1-918-628-3284). INTERNATIONAL: 1-617-769-8000. CANADA: 1-800-268-3233. EUROPE: 41-38-22-6101.

The #1
3270 Alternative.

TELEX

TELEX COMPUTER PRODUCTS, INC.

IBM is a registered trademark of International Business Machines Corporation.
Telex is a registered trademark of The Telex Corporation

CIRCLE 531 ON READER SERVICE CARD

# Look At What The Editors Are Saying!

PC MAGAZINE

## PC Magazine Editor's Choice

# Standard-286 II

## 8 MHz/0 Wait State

"The only thing standard with the CompuAdd Standard-286 ii that I tested was its AT compatibility and its name. With its 8-MHz clock, zero wait state, speed and reset switches, and six 16-bit buses, the Standard-286 ii stands out from its competition...its performance, features, and price are enough to make me want to take it home."
Vincent Puglia PC Magazine Vol. 6 #3

"In Short: Low base price, a Phoenix BIOS, the ability to switch speeds without rebooting, and a reset switch make this one of the best of the bargain compatibles." PC Magazine Vol. 6 #3

- 8MHz Speed
- 0 Wait State
- Intel 80286 Processor
- 200 Watt Power Supply
- Clock/Calendar w/Battery Back-up
- One-Year Warranty
- AT Style Keyboard
- Phoenix BIOS
- 512K RAM
- 1.2MB Floppy Drive

## Now Only. . . $995

### *Enhanced Versions:*

**Standard-286/10**
10MHz processing spsed with one wait stats. **$1049**

**Standard-286/12**
12MHz processing speed with one wait stets. **$1895**

## "PROFESSIONAL STARTER KIT"

### Computer

286/10MHz system with Intel 80286 processor (with switch-selectable 8MHz or 10MHz processing speed), Phoenix ROM BIOS, 512KB RAM, (expandable to 1MB on motherboard), 8 expansion slots, 200 watt power supply, 1.2MB floppy drive, 5060 style keyboard, duel floppy/hard drive controller, clock/calendar w/battery backup.

### Monitor and Diapley Adaptor

High resolution (750 x 350) amber monochrome monitor with 12" display screen and Herculss compatible monographics card with parallel port.

### Printer

Fast 180 CPS dot metrix 80 column quiet printer with graphic mods, near letter quality mods, tractor/triction teed and repleceable print head.

### Software

MS-DOS 3.2 operating system. Introducing the new professional Zen Word Software: **Professional Word** now includes mailmerge and supports most font styles and printers (even laser printers!), **Professional Calc** offers linear regression with over 250,000 cells available. **Professional Link** offers greater capability and flexibility plus additional terminal support for ANSI-X 3.64 and VT 100.

### Herd Drive

20MB Seegate Herd Drive fully installed, with 65ms access time, an industry favorite

### Modem

1200 Baud internal modem with software, ½ card, fully Heyes compatible, auto answer, auto dial.

### Accesaories

Parallel printer cable, box of 10 high-density diskettes, 200 sheets continuous form paper.

## Only. . . $1995

**Professional Starter Kit EGA $2395**

14" EGA high resolution color monitor and enhanced graphics adaptor card for vivid colors and graphics

# CompuAdd

"Personal Computer Products"

12303-G Technology Austin, TX. 78727

**Call Toll Free:**
**800-531-5475**

Tech Support 800-527-3125
In Texas Call 512-250-5541

IBM & AT are registered trademarks of International Machines Business Corp
Hercules is a trademark of Hercules & MS is a trademark of MicroSoft

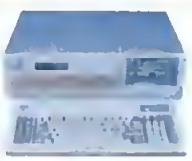
# Super Savings, Service & Support!

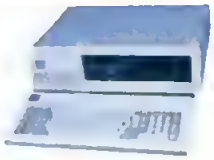
## Discount Prices on Brand Name and Standard Brand Products...

### TURBO-88

- Keyboard selectable clock speed
- AT™ style keyboard
- 256K expandable to 640K on motherboard
- 8 expansion slots
- Intel 8088-2 (4.77 or 8MHz)
- 1-360K half-height drive

8 MHz **$495**





### IBM PC-AT™

- Dual floppy/hard drive controller
- 256K RAM
- One 1.2MB floppy

**$2495**

### IBM PC-XT™

- 256K RAM
- One 360K floppy drive
- Expandable to 640K on motherboard

**$1195**

## "CAREER STARTER KIT"

**Everything You Need To Begin Serious Computing Immediately!!**

Only ..... **$895**

**Monographics Capability Included**

### Standard Turbo-88

IBM compatible Standard Turbo-88 system with Intel 8088-2 (4.77-8MHz) processor 256K RAM expandable to 640K on main board, and 8 expansion slots. Half-height, double-sided diskette drive, diskette drive controller, Hercules compatible monochrome graphics adapter card with parallel port, 135 watt power supply and AT(tm) style keyboard.

### Monitor

High resolution ( 750 x 350 ) amber monochrome monitor with 12" display screen

### Printer

100 CPS dot matrix 80 column printer with friction and tractor feed and all-pointe-addressable graphics capability

### Software

MS-DOS 3.2, ZEN Word (word processing & spell checker) ZEN Calc (spreadsheet) and ZEN Link (communication package)

### Accessories

200 sheets continuous-form paper, printer cable, and 10 blank diskettes

## BUILD YOUR OWN TURBO

TURBO Board **$159**

150 Watt Power Supply **$69**

System Chassis **$29**

The ***TURBO Board*** stands out from the competition:

- High-speed 8088-2 processor, keyboard switchable between 4.77MHz and 8MHz
- 1024KB capacity with 256K chips (150ns or 120ns)
- On-board clock-calendar with battery back-up
- Keyboard lock circuit
- Turbo LED circuit
- Hardware reset circuit
- BIOS included
- Game port
- 8 expansion slots

*ADD-ONS* to complete the system:

| | |
|---|---|
| Diskette Controller (FDC) | $39 |
| 360KB Diskette Drive | $99 |
| Keyboard | $69 |
| 256KB RAM chips (set of nine) | $29 |

*See our monitors and video cards elsewhere in this ad.*

IBM & AT are registered trademarks of International Machines Business Corp
Hercules is a trademark of Hercules & MS is a trademark of MicroSoft

Call Toll Free:
800-531-5475
Tech Support 800-527-3125
In Texas Call 512-250-5641

12303-G Technology Austin, TX 78727

# CompuAdd

"Personal Computer Products"

turn page

# The Standard Solution!!

**CompuAdd** "Personal Computer Products"

*Enhancement Products for IBM® PC's and Compatibles*

**STANDARD BRAND PRODUCTS**

## STANDARD MonoGraphic Card

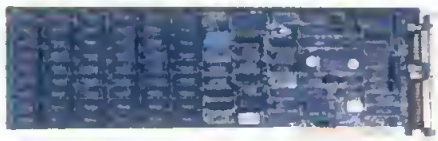
*Hercules® Compatible Monochrome Graphics Card*

Text Mode 80 Col x 25 Characters
Graphics Mode 720 x 348 Pixels
Parallel Port

**$99**

## STANDARD MFC w/384K

*Multifunction Card*



384K RAM
Clock/Calendar
Serial Port
Parallel Port
Game Port
Software

**$125**

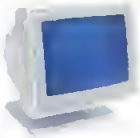
## Monochrome

*Monochrome Display Card*

**MonoCard** w/Parallel Port **$79**

## Monitor

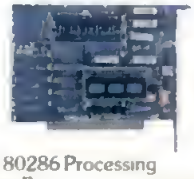
*Amber Monochrome Display*



**Samsung** 12" Flat Screen With Tilt & Swivel Base **$109**

## Accelerator

**CHARGE CARD 286**



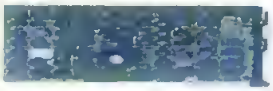
Intel 80286 Processing Power For The PC **$295**

## Internal Modems

**1200 Baud** Standard Brand **$99**
**1200 Baud** Everex **$129**
**2400 Baud** Everex **$239**

## Color Video

*Color Display Cards*



**ColorCard** w/Parallel Port **$79**
**EGA Card** 640 x 350 Pixels 256K Display RAM **$179**

## Monitor

*EGA Color Monitor*

**Samsung** 14" High Resolution **$439**

## Power Supply

150 Watt UL/CSA Listed **$69**

## External Modem

**1200 Baud** Fully Compatible **$139**

## I/O Cards

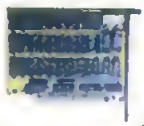
**AT I/O** Serial & Parallel Port **$75**
**PC I/O** Also has a Clock/Calendar & Game Port **$79**

## AT-MFC

*Multifunction Card for AT®*

Up To 1.5MB Memory Expansion
Serial & Parallel Port
for IBM AT® w/0K **$169**

## Memory Cards



**MEM-576** w/0K **$39**
**EMS PC** w/0K **$109**
**EMS AT** w/0K **$129**

## Keyboards

*For The IBM® PC or XT*

**5151-(Pictured)** **$69**
**AT Style** **$69**

No Charge For UPS Ground Shipping. No Surcharge For MasterCard or VISA. Fortune 1000 Purchase Orders Welcome. Warranty Work Requires Proof Of Purchase And Return Authorization Number.

Hercules and Hayes are trademarks of their respective companies.

**CompuAdd** "Personal Computer Products"

12303-G Technology Blvd Austin TX 78727

**Call Toll Free: 800-531-5475**

Tech Support 800-527-3125

In Texas Call 512-250-5541

# HARD DISK PROFESSIONALS

**Full Documentation • Illustrated Manuals • One Year Warranty • Toll Free Tech Support***

## MiniScribe

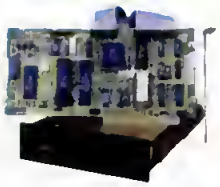
*Quality Hard Disk Drives For AT® Compatibles*

- One Year Warranty
- 28 ms Average Seek Time
- Linear Voice Coil Closed Loop Servo System
- Whitney Technology Flexures And Sliders
- Fail-Safe Automatic Actuator Lock
- Low Power-14 Watt Standby Power

**42MB . . . . . $595**
**70MB . . . . . $895**

### Hard Drive Kits for PC's and Compaqs

Hard disk drive, controller board, cables, mounting hardware, installation manual. Compaq kit has 3½" shock-mounted drive.



**20MB** . . . . . **$375**
**30MB** (RLL) . . . . . **$449**
**20MB** (for Compaq) . . . . . **$395**

### FlashCard-20

- Western Digital Controller
- Boots From FlashCard
- 20MB 3½" Hard Disk
- One Year Warranty
- Installs In Minutes
- Shock Mounted

**$429**

PC MAGAZINE
**Editor's Choice**

"For those more concerned with budgets...the **Standard Brand FlashCard-20** and **Flash Card-30** stand out as the best low-cost choices.. We also like their straightforward and honest simplicity. Either product would be a good, honest addition to your PC."
Winn L. Rosch
PC Magazine Vol. 6-3

### FlashCard-30

- Western Digital Controller
- Boots from FlashCard
- 30MB 3½" Hard Disk
- One Year Warranty
- Installs in Minutes
- Shock Mounted

**$495**

### Tape Backups

NEW!

**Stream-20** (Teac) . . **$580**
**Stream-60** (Wangtek) **$757**

### Teac or Panasonic

**$99**
**360K Floppy Drive For IBM AT®**
**$109**

### AST SixPakPlus

- 384KB RAM
- Parallel Port
- 2 Year Warranty
- Serial Port
- Memory Expansion
- Clock/Calendar

**$195**

### NEC MultiSync Monitor

Adjusts horizontal frequency, up to 800x560 resolution, supports TTL and analog inputs, 13" display.

**$599**

### intel

**8087-3** . . . . . **$129**
**8087-2** . . . . . **$159**
**80287** . . . . . **$219**
**80287-8** . . . . . **$269**
**Above Board/AT** . . . . . **$399**

### Memory Chips

**64K 150ns** . . . . . **$9**
**256K 150ns** . . . . . **$29**
**258K 120ns** . . . . . **$35**

### EPSON

**LQ-800** . . . . . **$609**
**LQ-1000** . . . . . **$759**
**FX-286** . . . . . **$575**
**FX-86e** . . . . . **$395**
**LX-86** . . . . . **$259**

### OKIDATA

**192+** . . . . . **$365**
**193+** . . . . . **$549**

### ORCHID

**Tiny Turbo 286™**

- Uses 80286 Processor (8MHz)
- Keeps Original 8088 In System
- Processor Selectable To Insure 100% Compatibility
- Optional 80287 Numeric Processor

**$379**

### PGS Princeton Graphic Systems

**HX-12** Color Monitor . . . . . **$449**
**HX-12E**
Enhanced Color Monitor . . . . . **$539**

### AMDEK

**310A**
Monochrome Monitor . . . . . **$159**

### Video 7

**Vega EGA Deluxe**
Compatible with IBM EGA, 256K of Display RAM. **$369**

**Our Policy:** All prices include fully insured UPS ground shipping on all orders shipped in continental U.S.A. No surcharge for VISA, MasterCard or UPS C.O.D. payments (Minimum purchase of $[illegible] on COD & net term orders). We accept Fortune 1000, Governmental & institutional purchase orders on a net terms basis (with credit approval) at no additional charge. Allow 7 days for personal check and company checks to clear. No warranty work done without proof of purchase.

Add 7.[illegible]% sales tax if a Texas resident. Prices are subject to change. All equipment carries a new factory warranty. All returned items must be accompanied by a return authorization number and subject to a restocking fee.

**Corporate & Institutional Accounts Welcome:** Our national accounts division is dedicated to providing the prompt professional service required to keep your business running smoothly. We accept P.O.'s on a net terms basis (minimum order $[illegible] please) offer next day shipping, free fully insured UPS ground shipment. We offer a full-time technical staff to answer any questions that might arise and to make fast repairs if needed. You will notice the difference.

AST, SixPakPlus, Advantage!, and RAMpage! are registered trademarks of AST Research Inc. IBM, PC-XT, and PC-AT are registered trademarks of International Business Machines Corporation. Amdek, Compaq, Epson, Hayes, Hercules, Intel, Okidata, Panasonic, Princeton Graphic Systems, and Teac are trademarks of their respective Companies.

CompuAdd

**Order Toll Free:**
**800-531-5475**
In Texas Call: 512-250-5541
Tech Support: 800-527-3125

CIRCLE 227 ON READER SERVICE CARD

# ACCESSING MESSAGES AUTOMATICALLY

*Designed to deal with CompuServe's forum message bases, ATO and ZAPCIS let users read and answer messages with greater ease at a lower cost.*

Like most users, when I first started taking part in the forum message bases on CompuServe, I found coping with the system a daunting experience. The on-line editors require you to retype whole lines to make changes. I was very conscious of the meter running at $.25 per minute when answering messages. For more complicated actions like asking for a list of message topics and deciding which to read, it was worse. I frantically scribbled the five-digit topic numbers on a sheet of paper as the topics scrolled by. Often I couldn't decipher the number when it came time to actually request the topic!

Then I discovered ATO (for AUTOSIG). This is one of three programs that are available for automated access to the CompuServe messages. Another called ZAPCIS (CIS is the abbreviation for CompuServe Information Service) has since come on the scene, and I have shifted over to using it. There is a third program called EJRYAM, which is a set of linked scripts written by E. J. Robinson for the communications program PROYAM, with optional macros for the file editor, KEDIT.

ATO is free. ZAPCIS is shareware for personal use and requires registration for commercial use. EJRYAM is free if you have the commercial program that it links to. Because I've never used EJRYAM, I'll limit my discussion to Version 3.2 of ZAPCIS, which I saw in beta test just prior to its scheduled release, and Version 5.22 of ATO, an intermediate beta test version with a release of Version 6.0 expected by the time you read this.

All the programs operate on the premise that you want to spend as little time as possible actually connected to CompuServe, and all assume that there are some things that a micro can do better than a time-sharing mainframe. If you want to read and answer messages addressed to you, a single keystroke instructs the program to log on, collect your waiting messages, and log off. You can then read the messages off-line one at a time and write your reply in an editor that the program provides.

One of ATO's biggest weaknesses is that its editor does not support reformatting or word wrap, although it is a full-screen editor with a mechanism for starting new lines without hitting Enter when you approach the right margin. I've been told that the authors of ATO hope to have a full-featured editor in the next public release. The ZAPCIS editor allows reformatting and contains even such advanced features as letter transposition. After you write your replies, a single keystroke tells the program to log you back on and leave the messages. Throughout, ZAPCIS or ATO insulates you from having to deal with formulating the proper commands to CompuServe.

**PC MAGAZINE FACT FILE**

**AUTOSIG (ATO)**
Downloadable from CompuServe IBMCOM, dl1
**List Price:** Free
**Requires:** 256K RAM, DOS 2.0 or later, Hayes-compatible modem.
**In Short:** A dedicated program by Vern Buerg with Don Watkins and others that makes interfacing CompuServe's message bases much more pleasant than with a nonspecialized communications program; especially strong on batch mode operations. Includes program for maintaining and accessing a database of CompuServe ID numbers. Supports CompuServe protocol B in terminal mode.
CIRCLE 606 ON READER SERVICE CARD

**ZAPCIS**
Omni Information Resources
P.O. Box 1996
Wilmington, DE 19899
(302) 475-3444
**List Price:** $50 for single commercial license; shareware for personal use with requested payment of "$20, $25, $50, more or less up to you"; sitewide licenses available.
**Requires:** 300K RAM, DOS 2.0 or later, Hayes-compatible modem.
**In Short:** A dedicated program by Howard Benner that makes interfacing CompuServe's message bases and data libraries much more pleasant than with a nonspecialized communication program; includes full-featured editor, a database of CompuServe ID numbers, and automated download of programs. Supports CompuServe protocol B in terminal mode.
CIRCLE 607 ON READER SERVICE CARD

**PPN PEN PALS** It's also a pleasure to leave new messages. For a recipient to be notified of waiting messages, you'll need his PPN—an 8- or 9-digit identification number. Both ATO and ZAPCIS allow you to keep databases of the PPNs of your correspondents. To leave a message for Don Watkins, the IBMNET sysop, I need only type in "\Don" at the "To:" prompt that ZAPCIS gives me, and it will search the database for "Don".

Collecting PPNs is also easy. When any message is displayed in ZAPCIS, hitting "P" will allow you to add the sender and/or recipient to the PPN database. ATO now comes with a similar setup—you can access a separate program that controls a PPN database by hitting Enter at ATO's "To:" prompt, and you can paste an entry from there back into the "To" prompt. Both programs also allow you to search a file of messages for a phrase and display the messages that have that phrase on the screen.

These programs show their real power when you want to deal with messages that are neither to or from you. You can choose to either read all the messages in a SIG written since you last read messages or do a quick scan of the topics. If you pick the latter, the programs allow you,

while off-line, to peruse the list and mark the ones that you want to read. A script file is created and a single keystroke will take you on-line to download the messages you've marked.

When using these programs, you often spend fractions of minutes connected to most SIGs that you access, particularly if you have a 2,400-bit-per-second modem. The fact that CompuServe rounds up to the nearest minute can add considerable overhead. For this reason, both programs offer the capability of accessing several SIGs during one call. For example, I recently checked five SIGs and downloaded five messages which were in the two SIGs that had messages waiting. It took ZAPCIS a minute and a half to do all that; since CompuServe rounds up only for an entire session and not for individual SIGs, this batch mode alone saved me 3 minutes of connect time. Three minutes per session, several times a day, over the course of a year amounts to hundreds of dollars, not to mention the greater convenience.

**POWER VS. EASE** ATO's greatest strength in comparison to ZAPCIS is its flexibility when using batch mode. If you would like to visit five SIGs, scan topics in two, but only check for your messages in the others, you'll have to log on twice with ZAPCIS or use its advanced mode in order to make your own script. You can choose which SIGs are activated during a given session, but you must take the same actions in all the chosen ones. ATO lets you do it in one session.

Except for this lack of flexibility in setting up your on-line actions, ZAPCIS is a somewhat more powerful program. For example, I am impressed with the intelligence ZAPCIS shows in handling the EASYPLEX electronic mailbox that CompuServe keeps for you. If you have mail waiting, CompuServe will notify you when you log on. Even if you have chosen EASYPLEX as a SIG you want to visit, ZAPCIS will only do so if you get this message or if you have mail waiting to be uploaded there. And what really makes me stick with ZAPCIS is its algorithm for uploading, which blasts messages onto the screen. After using several other communications programs to access CompuServe, I couldn't believe the upload speed the first time that I used ZAPCIS. However, as I was completing this article, I received a new version of ATO that has an upload speed almost comparable to that of ZAPCIS.

Both programs have a terminal mode that allows you to log on in interactive mode, and both support CompuServe's protocol B for binary file transfers. ZAPCIS goes a step further in dealing with the files in a data library by extending the automated transfer mechanism to this area. You can instruct ZAPCIS off-line to search the data libraries of a SIG for files meeting certain criteria. It will automatically download the descriptions of all files meeting the criteria, allow you to mark which you want off-line, and then automatically download them. Both programs have a split-screen terminal mode for conferencing.

These programs offer fairly good technical support: it seems that roughly a third of the messages on the IBMCOM forum deal with them. The authors are readily available, and many of the members will offer their advice also. It is not quite toll-free support, but with the speed

## DOWNLOADING ATO OR ZAPCIS

To download ATO or ZAPCIS, you need to log on to CompuServe with a program that supports binary downloads with the Xmodem, or, preferably, the CompuServe B protocol. Use parameters of 8 data bits, 1 stop bit, and N parity. If you use a program with Xmodem and it has a "relaxed" mode, use that.

New uploads are in dl0, so you'll want to check there first. After a month in dl0, versions of ATO wind up in dl1, and versions of ZAPCIS in dl3. The ATO files are named ATOnnn.ARC (where nnn is a version number) and ATODOC.ARC. The ZAPCIS files are named ZAPCIS.ARC and ZAPDOC.ARC.

At the main CompuServe prompt (!), respond `G IBMCOM<Enter>`. You will first be invited to join that SIG. After doing that, either you will be shown a menu and given a prompt of "Enter choice", or there will be no menu and a prompt of "Function:". In either case, answer `dl0 <Enter>`. If you want ATO, type in `bro ato*.* <Enter>` at the next prompt, and, if either of the ATO files is reported, follow the prompts to download it. If not, type in `t<Enter>` to return to the top menu followed by `dl1 <Enter>` and again the bro command. If you want ZAPCIS, replace `bro ato*.*` with `bro zap*.*` and `dl1` with `dl3`.

The programs are packaged in archives, and you'll need a de-arcing utility. If you don't have one, stop by dl2 and download ARC-E.COM. If you have any problems or if you're new to CompuServe or de-arcing, GO IBMNEW and review some of the help files there, or leave a message to the sysop. You should get a reply within 24 hours. If you want to say hello to me, feel free to leave a message—my PPN is 76505,2315.

**—Barry Simon**

# The Diconix 150. Take it or leave it.

The world's most portable printer performs as well on your desktop as it does when you're on the road. The small footprint reduces desktop clutter, while it enlarges a small budget.

PC MAGAZINE
The Best of 1986

DICONIX
A Kodak Company
3100 Research Boulevard
Dayton, Ohio 45420.

In the U.S., for the dealer nearest you, call 1-800-DICONIX Telex 288-280
In Europe, for the distributor nearest you, call (4121) 37 56 04
Telex 454-199 TXC CH

CIRCLE 241 ON READER SERVICE CARD

*"Accessing Messages Automatically" continued*

of access that these programs offer, it's close.

These programs do have some shortcomings: neither has very good documentation, and that of ZAPCIS is bad. It lacks an index or table of contents and is incomplete, although it has on-line context-sensitive help to partially offset this. But it is a shame that the program has features that you won't know about if you don't check out all the help screens. They also take some effort to set up, in the sense that you have to log on to CompuServe with another program and set parameters properly in several places.

Another problem is that CompuServe's system software sometimes undergoes minor changes: these can foul up the operation of this software. For example, several months ago, an extra space was added to the EASYPLEX prompt before the "!" in "Action !" A patch was needed for ZAPCIS and ATO. The authors are good at getting out new versions, but it is annoying to discover the need for a patch like this by having a message upload hang until you intervene manually.

Because of these changes, as well as problems with line noise and other unusual occurrences (like CompuServe's reacting to a message that is over the maximum size), there are times that manual intervention is necessary, often in the guise of logging off by hand. The programs make such emergency actions easy. However, I'd strongly recommend against using these programs for unattended operation, especially when uploading messages.

It is a typical experience that these programs don't save you nearly as much money on on-line charges as you'd expect. They make life on the SIGs so much more pleasant that invariably you do more and give up some of the savings that the programs produce.

On balance, there is no question that anyone spending any time dealing with messages on CompuServe should use these programs. My advice is to log on to IBMCOM right away and download one or both.—**Barry Simon**

within Infomaster-I, you can select specific services by issuing a "Go" command at the menu prompt.

Infomaster is primarily a database service, similar to Dialog, and has fewer videotext-type facilities than do some other services. Its real advantage is that it lets you access a variety of database vendors through a single source. Ordinarily when you subscribe to separate services you must log off one service, dial the second, log on, and initiate a search to cover all available databases. As Western Union expands its cross-vendor searching capability, this service will provide facilities not currently available.

> Using NewsNet is like having a research assistant who reads all of your magazines and clips only those articles you really need to see.

## NewsNet

Using NewsNet (from the company of the same name) is like having a research assistant who reads all of your magazines and newsletters and clips only those articles you really need to see. Your NewsNet assistant also carefully files away over 300 newsletters, wire service reports, and other publications so that you can search for any topic, even months later. Moreover, this service frequently gives you access to the on-line versions of printed publications even before they are available to conventional subscribers.

Sources available through NewsNet include United Press International, Associated Press, *USA Today*, plus such specialty newsletters as *American Banker*, *Church-News International*, *Hollywood Hotline*, *Computer Industry News*, and *World Business Intelligence Daily*.

Some of the newsletters tracked are specialized and relatively expensive, so the charges incurred during a NewsNet search can be much more reasonable than subscribing to the publications themselves. You can conduct historical searches or, with the NewsFlash service, you can have NewsNet automatically search for specific topics and notify you when the information comes on-line. Up to ten NewsFlash words or phrases can be active at one time. This is a useful and fascinating way to scan the current database offerings, but you must be precise in your search criteria, because each NewsFlash hit costs $.37 whether you read it or not.

Note that access to a few of NewsNet's on-line databases requires that you also be a subscriber to the printed version of the publication. In any case the on-line read price is generally lower for subscribers than for nonsubscribers.

NewsNet claims that 75 percent of the data it offers is not available on any other on-line service, and the remaining 25 percent of NewsNet information is available nowhere else, even in print. Certainly the ease of access produced by electronic searching and automatic triggers is rare. You may be able to find the data somewhere, but having it together in one place and electronically collated is a real plus.

NewsNet documentation is complete, and, considering the comprehensive nature of the information you can access, the service is easy and friendly to use. The service is command driven, but pressing Return without entering a command causes a full-screen prompt to appear. This on-line help leads you through most of the necessary commands.

Electronic mail access to NewsNet and to any of the on-line publishers is supported. Companies can use this facility to send press releases directly to publishers, for example, or a user can ask publishers questions about their offerings, suggest story ideas, and the like.

## The Source

The Source, from Source Telecomputing Corp., is billed as an IBM-PC-oriented service that targets business and profes-

sional users, and it mirrors the philosophy of its parent organization, The Reader's Digest Co. The Source is designed to "provide people with 'self-help' information that they can use in making personal and business decisions, and improving the quality of their lives."

Access to The Source is both menu and command driven. Similar to CompuServe and Delphi, it offers a variety of services, including special interest groups, communications, on-line shopping, and news. STC's Participate computer conferencing supports electronic conferencing for businesses, schools, and individuals.

Unlike CompuServe and Delphi, The Source requires a minimum of $10 per month usage. You are charged this fee whether or not you use The Source during a given month, but the charge is credited toward the amount you use. In other words, if you use only $5 worth of on-line time with The Source during the month, you will be billed $10. If, on the other hand, your on-line charges amount to $15 in a month, your bill will be only $15. In addition, The Source has some useful free and discounted services to offer. You can review tutorials, billing rates, and general Source information for free, and Chat sessions are billed at the 300-bps rate regardless of the communications rate you actually use while on-line. Chat is a real-time, interactive mode that connects you with other on-line users in a direct, conversational mode.

If heavy research is secondary and your primary need is for a variety of services, The Source could well serve as your one and only on-line company.

## Vu/Text

It would be at least partially correct to term Vu/Text, from Vu/Text Information Services Inc., as a newspaper database. The Associated Press news wire is there, as well as that of the *Washington Post*, the *Philadelphia Inquirer*, the *Miami Herald*, and the *Wichita Eagle-Beacon*.

You can also find such services as the PR Newswire, a distributor of news releases from up to 10,000 companies, and the Recipe Database, a listing of all the recipes published by the *Detroit Free Press* since September 21, 1983.

Vu/Text documentation, detailed and helpful, is similar to that of Dialog. In fact, the "blue sheet" descriptions of individual databases are generally more detailed than the ones Dialog supplies. There are good search strategy examples, and samples are provided for the range of on-line commands. The service uses cryptic codes for the databases it supplies, and they aren't always mnemonic (N86 for the 1986 coverage of the *Philadelphia Daily News*, for example), but the on-line prompts are useful and the service is basically easy to use. Vu/Text is experimenting with an on-line help feature that will probably be expanded to a full-feature help facility. At the present time, however, it is limited in scope.

You will find some extremely useful information on Wilsonline that is not readily available on-line anywhere else.

This is strictly a database-searching service. The search strategies can be comprehensive, and the full text of most entries is available. Electronic mail and other ancillary services are not supported. Vu/Text does, however, have an on-line electronic calculator function that supports multilevel parentheses as well as four-function arithmetic. In addition, a mortgage calculator function will compute several aspects of a mortgage loan, including monthly payment, number of payments, interest, and the like.

## Wilsonline

Wilsonline, from H.W. Wilson Co., is primarily an index service. You can glean useful data from such collections of publication information as the Applied Science & Technology Index, The Reader's Guide to Periodical Literature, and the Cumulative Book Index. In all, Wilsonline offers electronic access to 23 reference indexes. The H.W. Wilson Co. has published the print versions of many of these indexes since 1898, so it is natural that the company should offer them on-line.

Search rates are about what you would expect in this industry, in the neighborhood of $1 per minute. If you log on to Wilsonline with a pretty good idea of what you are looking for and how to construct the search, you can come away from the session with useful information for less than $5. Annual subscription rates for heavy users are available, and subscribers to the print versions enjoy a reduced price for on-line searches.

This is a command-driven service with prompts and on-line help available on request. Wilsonline documentation demonstrates searching strategy with good explanations and pictures of on-line screens. One excellent feature of Wilsonline is the ability to link up to eight files for simultaneous searching. This feature permits you to scan several likely locations and retrieve found references without having to select each file individually. You can also save a search strategy for easy repeated use.

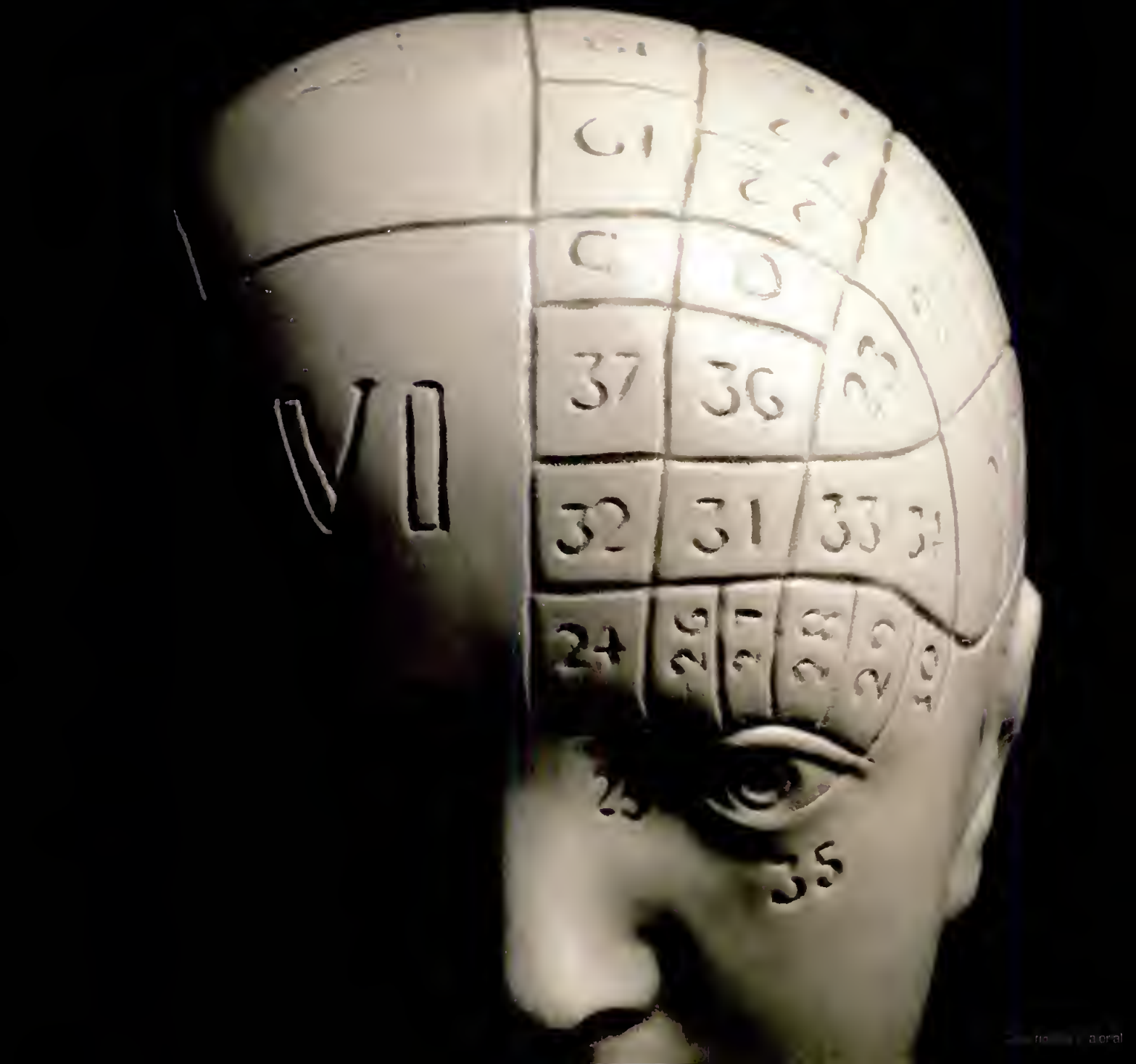
The range of databases offered on Wilsonline is narrow compared to some on-line competitors, but remember that the majority of offerings on Wilsonline are, themselves, compilations, so their usefulness is enhanced accordingly.

Moreover, you will find some extremely useful information on Wilsonline that is not readily available on-line anywhere else. The Reader's Guide to Periodical Literature and the Business Periodical Index are examples.

For libraries and other research-oriented institutions, Wilsonline is a natural choice in addition to any other on-line services that may be in use. There may be some duplication if, for example, you have Dialog and Wilsonline, but you also will get files on Wilsonline that you would miss with Dialog alone. PC

*Tom Badgett is a computer industry researcher and free-lance writer based in New Jersey. His most recent book is* Insider's Guide to Lotus 1-2-3.

# THE INTELLIGENT PERSON'S GUIDE TO NETWORKING.



# THE 3SYSTEM. ALL YOU'LL EVER NEED TO KNOW.

Buying a network can be a headache.

With problems like complicated installation and usage, incompatibility and lack of connectivity.

Leaving you with the feeling that it really shouldn't be that difficult.

We couldn't agree more.

That's why we created the 3Com 3System.

A total system solution designed and produced by a single company to optimize network productivity.

The 3Com 3System is as easy to install and manage as it is to learn and use.

You can link network to network, even when they are miles apart or running on different industry standards. You can also link micro to mini to mainframe with products like DCA's IRMALAN.

That's because the 3System is an "open system."

Which means it can work equally well with both IBM PCs and Macintoshes.

Copyright 3Com Corporation 1987. 3Com and 3+ are registered trademarks and 3Server3, 3System, 3Station and Workgroup Systems are trademarks of 3Com Corporation; IBM and IBM PC are registered trademarks of International Business Machines Corporation; Macintosh is a trademark licensed to Apple Computer, Inc.; IRMALAN is a trademark of Digital Communications

How is a 3System created?

Easy.

Run our 3+ operating software on our 3Server3 dedicated network server, incorporate your existing investment in PCs, printers, etc., via 3Com network adapter cards and connectors. That's the 3System.

And now you can even incorporate our new 3Station. The netstation created to optimize 3System.

What applications can you run on the 3System?

Just about anything your business could possibly need. Like Database, Publishing, Decision Support, Communications and Accounting.

We've worked with the developers of today's most popular multi-user software, like Ashton-Tate, Microsoft, Lotus, Aldus, Software Publishing and others to certify their products for optimum performance on your 3System.

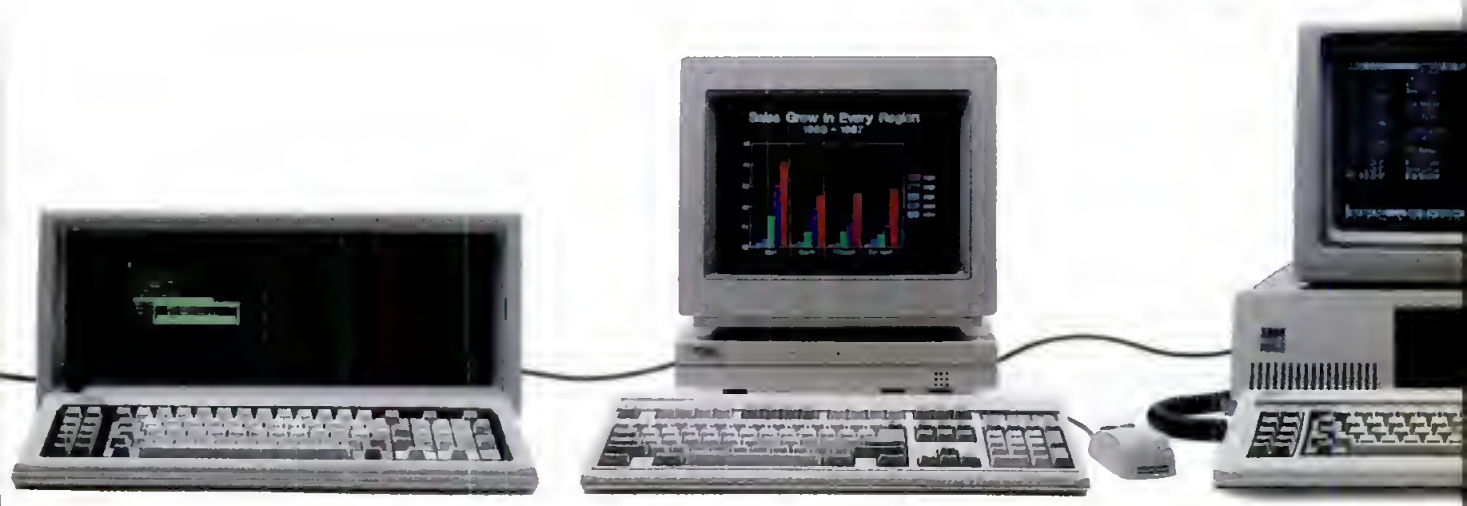
And because the 3System will be configured and installed by authorized 3Com dealers, it will have the after sales service and training you would expect.

Plus the 3Com guarantee of complete satisfaction.

As everything from 3Com always has.

For your nearest 3Com dealer, call 1-800-NET-3Com.

**3Com®**
**WORKGROUP SYSTEMS**



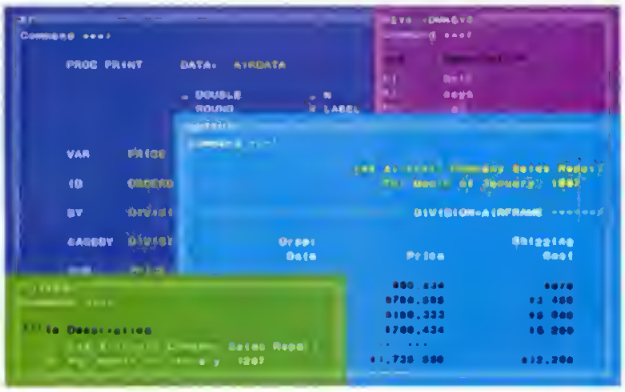
Associates, Inc.; Ashton-Tate is a registered trademark of Ashton-Tate; Microsoft is a registered trademark of Microsoft Corporation; Lotus is a registered trademark of Lotus Development Corporation; Aldus is a registered trademark of Aldus Corporation; Software Publishing is a registered trademark of Software Publishing Corporation.

CIRCLE 238 ON READER SERVICE CARD

# The SAS® System

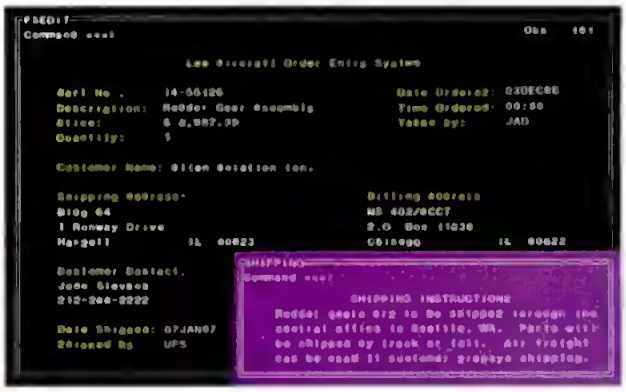
## Power Behind Every Window.

If you've been "window shopping" for software that's both powerful and easy to use, take a look at the SAS® System for Personal Computers. It's got everything you're looking for...and more.



**1 Ease of use.** The SAS System has ready-to-use procedures for every kind of analysis and report—from simple to advanced, preformatted to customized. A built-in menu system and on-line help guide you through the procedures. Special windows let you define titles and footnotes for reports, check the characteristics of your data, change function key definitions, and keep notes.

**2 Connectivity.** With the SAS System for personal computers, you get a built-in link to your host SAS System. You can download corporate data; develop, test, and run applications on your PC; or move data and applications back to the host for execution. Plus the SAS System reads data from any kind of file, including dBASEII,® dBASEIII,® and Lotus® 1-2-3.®



**3 Integration.** The SAS System runs on mainframes, minicomputers, and personal computers so you only have to learn one software system no matter what hardware your company has installed. And as your needs grow, the SAS System grows with you. We're committed to supporting all the capabilities of our mainframe software system for your PC. Whether you license one product or several, you'll enjoy the same high-quality software, training, documentation, and support we've offered for 10 years. It's all part of our site licensing plan.

Call or write us today.

SAS Institute Inc.
Box 8000 ☐ SAS Circle
Cary, NC 27511-8000
Phone (919) 467-8000
Fax (919) 469-3737

The SAS System runs on the IBM PC XT and AT, IBM 370/30xx/43xx and compatible machines, Digital Equipment Corporation's VAX™ and MicroVAX II,™ Data General Corporation's ECLIPSE® MV series, and Prime Computer, Inc.'s 50 series. Not all products are available for all operating systems.

SAS is the registered trademark of SAS Institute Inc., Cary, NC, USA. dBASEII and dBASEIII are registered trademarks of Ashton-Tate. Lotus and 1-2-3 are registered trademarks of Lotus Development Corp. Copyright © 1987 by SAS Institute Inc. Printed in the USA.

# *Search Software:* DIRECTORY ASSISTANCE

*On-line databases can open doors to a wealth of information, but only if you know how to unlock them. The following programs devise search strategies that help minimize expensive on-line time.*

When the lure of bulletin board software downloads and CB simulators wanes and you need to do some serious research, you're ready for one of the on-line academic or scientific databases. Among the most popular of these are Bibliographic Retrieval Service (BRS) and Dialog. Together, these databases form the core of a repository for current and historical data that will satisfy all but the most arcane research needs. You may have to follow up your Dialog or BRS search with more detailed information from other sources but, in the same way that the *Encyclopaedia Britannica* codifies a vast body of knowledge into an accessible, manageable form, these on-line services collect data from a broad range of sources in many disciplines.

Unlike in the *Britannica*, however, everything isn't packaged neatly in alphabetical order. Moreover, the volume of information stored in even a single file on one of these services may surpass what you might find in an entire encyclopedia. And BRS offers nearly 150 such files; Dialog, more than 250.

In addition, each service has a slightly different search procedure and a different catalog of offerings. In fact, if you don't access a given database with some regularity, it is difficult to remember from one time to the next exactly how to find what you want. At a dollar a minute—the average charge for access to these databases—you can't dawdle over the keyboard trying to construct a meaningful search strategy.

That's why a growing number of software search aides has evolved. These searching shells, which take the place of standard asynchronous communications and terminal emulation software, help you select on-line services and construct a

search strategy. Generally, search strategies can be constructed off-line, saving connect time and on-line charges. The software packages also offer varying amounts of guidance in choosing specific databases to search.

We looked at three of the most readily available of these search aides: *Sci-Mate Searcher* from the Institute for Scientific Information (ISI), *Pro-Search* from Personal Bibliographic Software (PBS), and *Search Helper* from Information Access Co. (IAC). None of these programs is copy protected, and each performs the basic functions of communications and database selection. All offer off-line search construction and automatic log-on to the requested service. But there is a wide range in the quality of the user interface among these three programs.

**SEARCHING FOR EFFICIENCY** To access on-line data efficiently, you have to know where each type of information is stored, know the record structure of the files, and understand at least something about Boolean search logic.

Moreover, the cost of these services creates a strong incentive for efficient searching. Whereas you can play all night on Videotex for $.10 or $.15 per minute, you'll pay from $1 to $2 per minute on Dialog or BRS, and you might pay from $.15 to $.50 for each on-line record you view. If you applied CompuServe or The Source browsing techniques to these databases, you'd incur hundreds of dollars in charges before you'd find anything.

Because of the volume of reference and full-text files you can scan in a short time, however, the actual cost of any one search can be relatively small. We tried a Dialog search of the Psycinfo database—the American Psychological Association's collection of 20 years of data from 1,000

# THE LOGIC BEHIND DATABASE SEARCHES

George Boole was a British mathematician who postulated a series of mathematical relationships in his 1854 work, *The Laws of Thought*. His symbolic notation for logical relationships forms the basis of Boolean algebra, an area of mathematics that is used heavily in modern computer systems.

Computer hardware uses gates, or switches, that perform logical tests on circuit conditions using prescribed AND and OR relationships. You frequently use similar relationships in designing database searches to select precisely the information desired and to lock out everything else.

The logical operators AND, OR, and NOT can be used to construct very precise search strategies. By using parentheses and multiple logical operators you can produce exact, though potentially complex, search scenarios—if the database you are searching supports such logic.

Suppose, for example, that you are looking for general information about personal computers. If the database uses a FIND command to initiate such a search, a very broad search statement might take the form

```
FIND personal computers OR
microcomputers
```

Sometimes logical operators in a command are set off by periods, pound signs, or other delimiters:

```
FIND personal computers .OR.
microcomputers
FIND personal computers #OR#
microcomputers
```

The OR operator in this example means that any record that contains the string "personal computers" will be selected; also, any record that contains the string "microcomputers" will be selected. Some records may, in fact, contain both strings, but either string is sufficient for a record to be selected.

If the database is very large, the number of hits, or found records, that contain either of these strings is also quite likely to be very large. You could narrow the search by including additional logical conditions:

```
FIND (personal computers OR
microcomputers) AND ibm
```

Now only records that contain one of the original strings (personal computers, microcomputers) and that also mention "ibm" will be selected. The AND logical operator says that at least two terms must be found for a record to be selected. Records that contain the string "ibm" would not be selected unless they also contain either "personal computers" or "microcomputers."

Notice the use of parentheses to AND together a separate ORed condition. The parentheses create groupings of logical operations, as they do with mathematical operations. The conditions inside the parentheses are evaluated first.

You could lock out ibm from the search with the NOT operator:

```
FIND (personal computers OR
microcomputers) NOT ibm
```

Depending on the implementation of the search logic, you may have to use both AND and NOT for a valid search:

```
FIND (personal computers OR
microcomputers) AND NOT ibm
```

Another example: We know that Compaq has announced a new 80386 microcomputer. Suppose you want to find out who else has announced such a machine. You would use

```
FIND (personal computers OR
microcomputers) AND 80386 AND
NOT Compaq
```

You can usually nest logical statements to construct relatively complex search criteria:

```
FIND ((personal computers OR
microcomputers) AND 8Ø386) OR
((personal computers OR
microcomputers) AND 8Ø286 AND
NOT ibm)
```

This would find anybody's 80386-based machine, as well as every company except IBM that offers an 80286 microcomputer or personal computer.

**—Tom Badgett**

periodicals—looking for two keywords in article titles. We printed 17 valid bibliographic references with detailed article abstracts for less than $5. If your time is worth anything, you couldn't locate the proper library index, find a table, and retrieve even one reference for that. Also, remember that since we were looking for keywords anywhere in the title, an alphabetical list of printed references would have been of questionable value because it wouldn't guide you to keywords embedded in the title.

> The cost of on-line academic and scientific databases creates a strong incentive for efficient searching.

**WHAT TO LOOK FOR** The most-desirable features of search aide software are automatic log-on and log-off, automatic service selection, database descriptions, regular updates, downloading found records, help with designing searches, and the ability to save search strategies to disk. Two of the three packages we reviewed have these features in some form. You might also look for such extras as support for bibliographic formatting of downloaded records and session cost accounting.

Do you need any of these software features? That depends on your research habits and your level of computer skill. Any of the software programs we reviewed would be a major help to the neophyte on-line researcher. All of them step you through the process and guide you toward consistency in your research habits. We also found that even for experienced computer users and people who are used to conducting on-line searches without support software, the more efficient of these packages can improve search techniques and, in fact, will promote more frequent use of the on-line facilities. Also, you can work off-line to refine your search strategy before you start paying on-line charges.

**JUSTIFYING THE COST** You still need to study your usage patterns carefully to justify this type of aid, however. Take IAC's *Search Helper* package, for example. The basic cost is $1,600 for the software and 300 searches. Each search gets you up to 20 retrieved records that you can print but not download. All of IAC's seven databases are available from Dialog at an average cost of $1.54 per minute. If you search Dialog direct, without additional software support, you can spend about 17 hours on-line with IAC databases for the same $1,600. That's a long time, especially if you do some off-line planning before you log on, using Dialog's "Blue Sheet" database descriptions and pencil and paper. On-line searches are fast and, at 1,200 bits per second, you can view information quickly; also, there are no sign-up or minimum monthly fees on Dialog.

A package such as *Sci-Mate Searcher*, on the other hand, may be more cost effective. It costs no more than many terminal emulator and asynchronous communications packages, yet it is designed with the on-line researcher in mind: you can amortize the one-time license fee of $150 quickly, you have help with the off-line planning stages, and you have access to a much broader base of on-line services.

In any event, you can justify the cost of a search aide package even when you don't use on-line searching often, as long as when you do use it the level of importance associated with a thorough and quick search is relatively high. In a situation like this, you want reliable results, and you don't have time to relearn searching strategies all over again each time. As with any software, you can decide if you need a search package only by understanding your individual needs and patterns of use.

## Pro-Search

Experienced database searchers may know *Pro-Search* as *In-Search*, originated by Menlo Corp. Personal Bibliographic Software (PBS), of Ann Arbor, Michigan, purchased all rights to *Pro-Search*, the successor to *In-Search*, in May 1986 and has since enhanced the package.

*Pro-Search* offers the most extensive features of any package we reviewed. It supplies descriptions of each of the databases offered by BRS and Dialog in a side-by-side card-file format. It is easy to compare categories, coverage, and cost between the two services and among the databases available, and these database descriptions are updated monthly. The graphics-oriented screens use light bars and shading to guide you through the selections. Response time is quick, and the program's operation is natural and easy. In fact, once you are past the installation, which consists of typing COPY *.**drive spec* at the DOS prompt and running a menu-driven installation program, you probably won't need the manual to get started with the software. Context-sensitive help is available, and when you do need the manual it is organized in an open, easily accessible manner, complete with an index and a detailed table of contents. A

EDITOR'S CHOICE

PC MAGAZINE FACT FILE

***Pro-Search***
Personal Bibliographic Software Inc.
P.O. Box 4250
Ann Arbor, MI 48106
(313) 996-1580
**Current Version:** 1.04
**List Price:** Basic Software, $495; updated category disk, $50; quarterly category update service, $150/year; *In-Search* upgrade to *Pro-Search*, $100; *Pro-Cite* bibliographic support, $396; *Biblio-Link*, $195/service.
**Databases:** Preconfigured for BRS and Dialog; up to 23 user-defined services supported.
**Requires:** 256K RAM, DOS 2.0 or later, (320K RAM required with DOS 3.0 or later), modem.
**In Short:** A full-featured, professional search aide with an intuitive user interface. Supports asynchronous communication, comparative database descriptions and costs for BRS and Dialog, automatic service selection, user-defined services, accounting, and bibliographic preparation. *Pro-Search*, the most expensive package reviewed, is delivered on six disks, four of which contain the Dialog and BRS database descriptions. Not copy protected.

CIRCLE **667** ON READER SERVICE CARD

# EVA/480 Will Change Your Perspective of an EGA Board.

640 x 480 Mode

Zoom Factor of 2

Tseng Labs has the graphics card you have been looking for if you're serious about computer aided design. The Eva/480 has both the widely accepted 640 x 480 standard and EGA resolution. While adhering to standards, consider your real needs.

The Hardware zoom, as pictured here, clearly shows the difference between ordinary and extraordinary. Allows close up detail instantly with the touch of a finger.

The Viewport window compliments the hardware zoom. While in the zoom mode, you can move very quickly to offscreen data. Combined with panning, zoom gives you more efficient pixel editing.

Also, the Eva/480 runs all EGA software. Plus, there are 640 x 480 drivers provided for popular software packages. Eva/480 gives you much more than just compatibility.

These enhancements over typical EGA cards are available because the Eva/480 is based on our own VLSI chip set — ET2000. Tseng Labs does more than just manufacture boards — we develop the technology.

**1-215-968-0502**

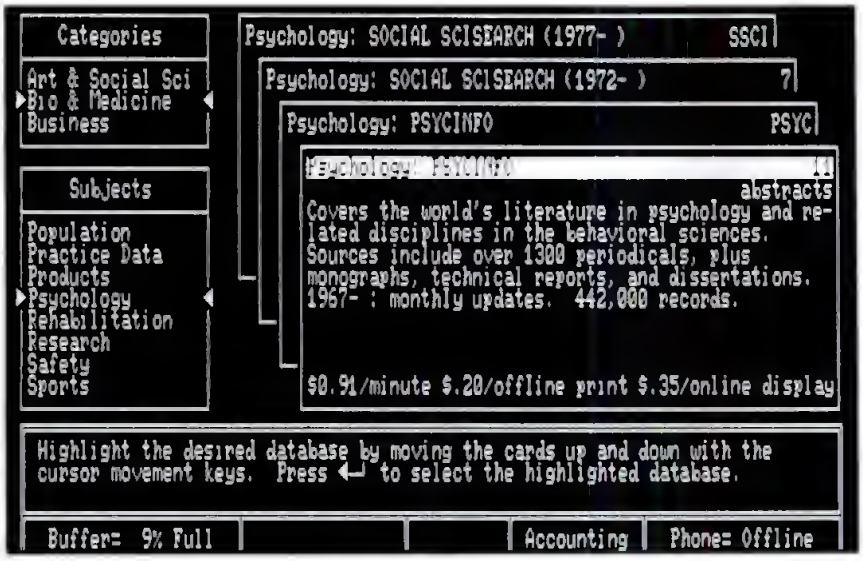
**Tseng Laboratories, Inc.**

10 Pheasant Run □ Newtown, PA 18940

CIRCLE 119 ON READER SERVICE CARD

Eva/480 and ET2000 are registered trademarks of Tseng Labs. All other product names are trademarks of their manufacturers.

# DATABASE SEARCHING SOFTWARE




Pro-Search's *main screen uses windows to show search categories, major search topics for each category (second, small left-hand window), and database descriptions and costs (large right-hand window). In this example, Biology and Medicine has been selected in the first window, Psychology is in the second window, and PSYCINFO is the selected database.*

function key template is also included.

*Pro-Search* is a good combination of menus, on-screen prompts, and do-it-yourself. You can enter queries one at a time, then retrieve them by pointing to them with the highlight bar and selecting Retrieve from a *1-2-3*–like menu. You can enter search specifications on individual lines, then combine them with standard Boolean logic. Tested search strategies can be saved to disk for later use. On-

from PBS can make *Pro-Search* even more useful. After database records have been retrieved, you can process them with *Biblio-Link*, which puts them into a form acceptable to the *Pro-Cite* database. With *Pro-Cite* you can create bibliographic entries for manuscripts in most popular formats. In addition, you can use the *Pro-Cite* database as a general research tool to hold records entered by hand. This gives you a research tool with data stored locally. With

*Search* and *Search Helper* in functionality. While it offers access to any of the BRS and Dialog databases, service and database selection is more of a manual process than with *Pro-Search*.

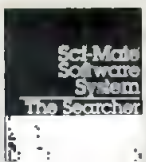
On the other hand, there is rarely any doubt about what the software wants you to do. Each step of the search process is fully prompted and easy to follow. For example, as you change database selections, a new set of field names that corresponds to the database record structure is displayed. On-screen prompts help you use this display to construct an efficient database search.

A very nice feature is *Sci-Mate Searcher*'s ability to reformat downloaded records. Most of the database records on the supported services are displayed closely packed, without field labels. *Sci-Mate Searcher* adds field labels and separates each field onto a separate line before you see it.

Although *Sci-Mate Searcher* has a detailed menu structure that steps you through each aspect of software operation,

PC MAGAZINE

## FACT FILE




*Sci-Mate Searcher*
Institute for Scientific Information
3501 Market St.
Philadelphia, PA 19104
(800) 523-4092
(215) 386-0100

The
only way to
stay milestones
ahead is to
leave the pack
behind.

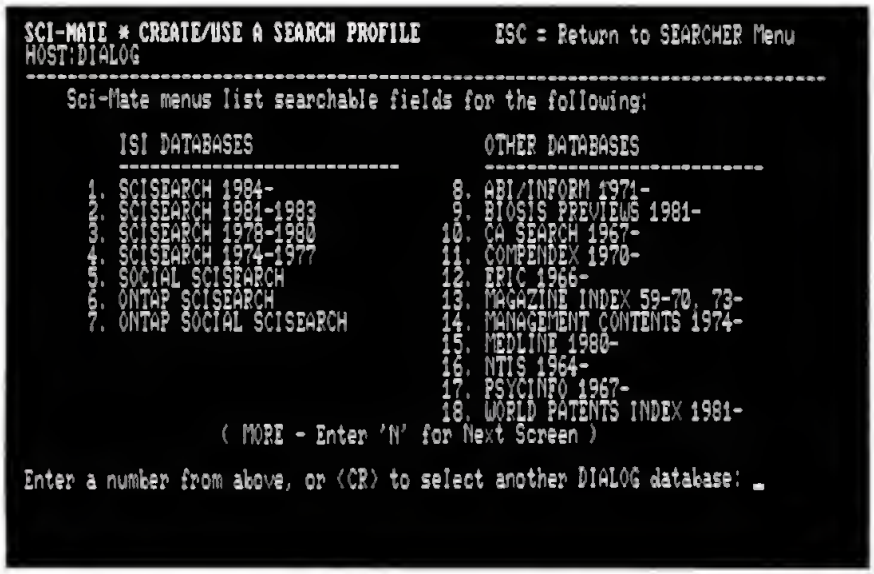
milestone: using LAN technology to give PC users total computer connectivity. UNA will make it possible for computers of all kinds to seamlessly communicate and share data with each other.

At Novell, we're not content to be the LAN leader. So we're pushing ahead. Establishing NetWare LANs as a powerful, cost-effective alternative to minicomputer systems. Supporting NetWare users through unique efforts like the NetWare Services Division, NetWare Centers International and NetWorld. And developing products that will make UNA and total connectivity a reality. In short, we're leaving the pack behind.

NOVELL.

Milestones Ahead.

CIRCLE 155 ON READER SERVICE CARD




*After the on-line service is selected—in this case, it's Dialog—you must create a search profile. This is the first of two screens that list available databases. You can also provide a Dialog database number for ones not listed here. Note that* Sci-Mate Searcher *is more general than* Pro-Search *and does not provide blue sheets.*

it feels like an old program. Where *Pro-Search* uses multiple windows, shading, and a light-bar cursor, *Sci-Mate Searcher* displays numbered menus that you have to read through each time to make a selection. And although the manual says a question mark entry at a menu will display on-screen help, all we got was a cryptic "Unable to HELP" message. Menu screens aren't handled consistently throughout the package—a potential source of confusion and frustration. For example, on some screens after the "Unable to HELP" message appeared, the whole screen was erased immediately and rewritten. On other screens, only the no-help message was replaced, and sometimes the screen didn't change after the no-help note was displayed.

A three-ring binder containing documentation comes with each package. The *Sci-Mate Searcher* manual is divided into separate tutorials for each on-line service supported, and there's a separate installation manual. The company offers toll-free telephone customer support.

The package is delivered with an ominous, full-page copyright notice and sealed disk. The other software we reviewed merely notes quietly that the software is copyrighted. Although the manual mentions a separate installation booklet, none was included with our package. In fact, we had to use the utilities disk from another *Sci-Mate* software package to complete the installation.

Where *Pro-Search* uses windows, shading, and a light-bar cursor, *Sci-Mate Searcher* displays menus you have to read through.

*Sci-Mate Searcher* was the slowest of the software we reviewed. Each new screen was filled a line at a time, giving the feeling that even the off-line screens were actually coming across a 1,200-bps telecommunications link. Perhaps this was done intentionally to maintain consistency in the user interface, but we found it annoying.

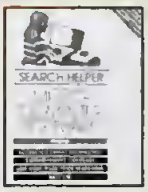
You can use *Sci-Mate Searcher* to access another host, applying the internal communications program as a standard asynchronous link.

Two additional support packages are available in the *Sci-Mate* series. *Sci-Mate Editor* helps you create and modify bibliographic data files. It has a variety of software tools to help you repare bibliographic entries in a number of formats. *Sci-Mate Editor* also lets you build bibliographic entries manually or by downloading found records from one of the on-line services. *Sci-Mate Manager* builds a database of downloaded records and supports custom searching and reporting.

## Search Helper

Designed for schools, libraries, or other institutions, *Search Helper*, from Information Access Co. (IAC), of Belmont, California, makes searching the somewhat limited range of IAC databases relatively

### PC MAGAZINE FACT FILE




***Search Helper***
Information Access Co.
11 Davis Dr.
Belmont, CA 94002
(800) 227-8431
(415) 591-2333
**Current Version:** 2.31.1

**List Price:** Annual software subscription, $250; 20-record on-line search, $3.50 to $4.50.

**Databases:** IAC databases only: Magazine Index, National Newspaper Index, Trade & Industry Index, Legal Resource Index, Management Contents, Computer Database, Newsearch.

**Requires:** 128K RAM, dual disk drives.

**In Short:** *Search Helper* handles automatic dialing and log-on chores, but it lacks a sophisticated user interface. For example, the only way out of the system is by pushing Ctrl-C, and this key combination works from anywhere in the software—a potential shortcoming. *Search Helper* will print found records, but the software does not permit downloading database references. Not copy protected.

CIRCLE 666 ON READER SERVICE CARD

# One Fast Son-Of-A-Pitch.

Face it. Speed talks. When running your business. And when running our Tri Printer.

It's called Tri Printer because it's three printers in one: providing data processing, true letter-quality word processing and high resolution graphics capabilities. All at a variety of character pitches and densities.

At 350 cps in data processing mode and 87 cps in letter quality mode, the Tri Printer is by far the fastest business printer in its class. Meaning that business conducted in the fast lane is finally supported by an equally fast printer.

In addition to its sheer speed, the Tri Printer's design surpasses the performance of printers that IBM, Apple and DEC make for their own computers. Improvements in important areas, like paper handling, font selection and quick-shift mode selection. And reliability.

Neither are there compatibility problems with your software. Because the Tri Printer emulates such popular printers as the Epson FX-100, IBM Graphics Printer, DEC LA210 and the Apple Imagewriter. Accomplished literally within seconds by merely changing personality cartridges.

Speed. It's still the acid test. For your business. And for our Tri Printer.

For more information on the Tri Printer, contact your distributor or CIE Terminals at 2505 McCabe Way, Irvine, CA 92714-6297; telephone (714) 660-1421 or (800) 624-2516.

C.ITOH

CIE Terminals

**CIE Terminals, Inc., 2505 McCabe Way, Irvine, CA 92714 • Telephone: (714) 660-1421 (800) 624-2516**

CIRCLE 348 ON READER SERVICE CARD

# Here's A Graphic Demonstration Of PCOX Technology.

Whatever you want in micro-to-mainframe graphics, wherever you want it. That's what you get with PCOX Technology.

Starting with a better view. Our 3279 S3G graphics give your PC the clearest, brightest and most accurate host graphics on the market. Our 3179 APA graphics come standard with 16 colors.

Both come with the power to run GDDM, SAS/Graph,® DISSPLA™ and TELAGRAF.™ Plus screen saves, printer and plotter support, and high speed file transfer. All standard.

But that's just the beginning.

PCOX Technology gives you the same graphics capability everywhere in your network. Whether your PCs are clustered around a controller, ganged up in a LAN or isolated miles away in branch offices. And if you have an IRMA™ board, it'll run there too.

PCOX graphics products also give you a uniform API and a software migration path to other micro-to-mainframe capabilities, including windowing, multiple host sessions, and more.

In fact, you can run just about any PCOX 3270 software—graphics or otherwise—in any combination, on any PCOX connection.

So you get true freedom of choice.

For micro-to-mainframe graphics, that's a first. For PCOX Technology, it's business as usual.

It's also the reason why more companies are standardizing on PCOX Technology for *all* their micro-to-mainframe needs.

Take a closer look at PCOX Technology, and the full line of PCOX micro-to-mainframe graphics products.

Then draw your own solutions.

**800-225-PCOX**
In California, 415-969-1999

CXI

CXI, Inc., 1157 San Antonio Road, Mountain View, CA 94043. Telex: 821945.

*Micro-to-mainframe's most versatile graphics family.*

*Clearer, brighter, more accurate S3G graphics.*

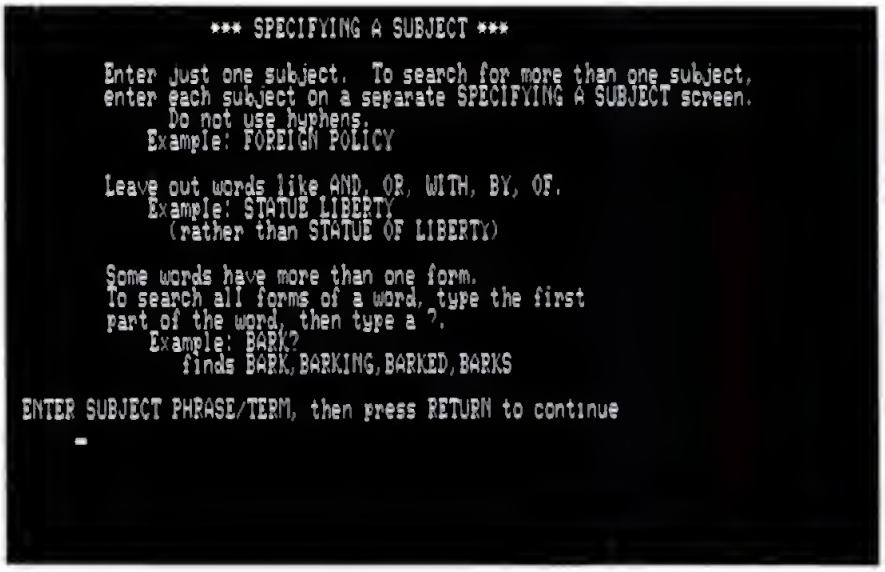
*APA Graphics for coax and remote environments.*

*Mainframe graphics for coax and remote LAN gateways.*

*Plus a software path to other micro-to-mainframe functions.*

PCOX is a trademark of CXI, Inc. IRMA is a trademark of Digital Communications Associates, Inc. SAS/GRAPH is a registered trademark of SAS Institute, Inc. DISSPLA and TELAGRAF are trademarks of Integrated Software Systems Corporation. © 1987, CXI, Inc.

**CIRCLE 215 ON READER SERVICE CARD**




*With* Search Helper, *after you've decided which database to search, you enter the person's name, subject, or subject phrase on which to search. You can specify as many of these subjects or phrases as you want for each search, but the only connector allowed is AND. If you try to enter Boolean logic on this line, an error is returned during the on-line portion of the search.*

easy. It helps you select a topic, dials the number, logs on to the service, selects the database, and conducts the search.

*Search Helper* automatically downloads the first 20 hits, then logs off. You can then display these 20 hits again, print them once, or redial to retrieve up to 20 more found records. But you pay for another search each time you log on.

However, the *Search Helper*/IAC combination offers the advantage of fixed-price searching. IAC offers two software and database packages: one for 300 searches, another for 700 searches. Each search includes up to 20 printed or displayed records, telecommunications charges, and *Search Helper* software; it costs either $3.50 or $4.50, depending on the package you select.

This package doesn't use screen graphics, nor does it support acquisition of information from any but IAC databases. You can't construct custom search strategies; instead, you enter search criteria on separate lines and the software constructs the search, using only AND logic. You can search for IBM *and* DEC, for example, but not for IBM *or* DEC. The other software we reviewed supports more-complicated, multilevel search strategies.

*Search Helper* is easy to use and requires no user's manual or lengthy learning procedure.

On the other hand, *Search Helper* is easy to use and requires no user's manual or lengthy learning procedure. If you have even a vague knowledge of on-line searching, you can easily make this package work for you.

The documentation consists of ten cardboard reference cards and a sticker on the disk jacket with instructions for loading the software, as well as a subject guide to IAC databases. The annual license fee includes software upgrades, a toll-free telephone number for customer support and search assistance, and computer lease or purchase arrangements.

Installation is automatic, using a DOS .BAT file, and the modem and communications link are tested during installation. However, a fairly lengthy testing procedure is conducted every time the software loads. Once the user-supplied telephone numbers and the modem hardware are tested, you shouldn't have to do it again unless you want to.

*Search Helper* runs relatively quickly. Even with searches that yielded 50 or more hits, log-on, search, and log-off were relatively quick. You can specify up to three access paths. If the first number is busy or a connection is impossible for other reasons, the second and third access numbers are automatically selected. The package keeps cycling through the numbers until it connects or until you stop the process. PC

*Tom Badgett is a computer industry researcher and free-lance writer based in New Jersey. His most recent book is* Insider's Guide to Lotus 1-2-3.

## PC MAGAZINE EDITOR'S CHOICE

**• Pro-Search**

Pro-Search, *from Personal Bibliographic Software, was the clear winner in this group. The* Pro-Search *software has a user interface that's modern, easy to use, and fast. There is little need for the manual because context-sensitive help is always a keystroke away. Screen formatting with multiple windows, shading, and card-file-shaped database descriptions help even the neophyte user access a potentially complicated service like Dialog with ease.*

*Moreover, extra features such as accounting and invoice preparation enhance the software's functionality. Additionally, the PBS support package includes a bibliographic database, a conversion program for downloaded records, and a report writer that will install references in just about any popular bibliographic format.*

PACESETTING TECHNOLOGY

# PACER-386

Tremendous advances have been made in personal computer software. Sophisticated business and professional applications software offers truly impressive capability.—But, how many times have you wished this software was faster! Laser Digital's PACER-386 was designed to do just that—up to three times faster than an AT class computer. Now, that large database program, massive spreadsheet or CAD drawing comes alive before your eyes with speed you have wished for but perhaps thought wasn't possible.

The PACER-386 delivers maximum performance for those applications which require the utmost in speed and system performance. Featuring Intel's newest and most powerful microprocessor, the 32-bit 80386 operating at 16 MHz, the PACER-386 is ideal for all speed intensive applications. PC and AT software is run in a normal manner but at the faster speed high performance applications demand.

Contact us today for the name of the dealer nearest you where you can see for yourself the advantages of using a state-of-the-art computer with state-of-the-art software.

*AUTOCAD is a trademark of Autodesk Inc. Microsoft Windows and XENIX are trademarks of Microsoft Corp. dBASE III PLUS is a trademark of Aston Tate Corp. Lotus 1-2-3 is a trademark of Lotus Development Corp. SCO XENIX System V is a trademark of The Santa Cruz Operation. Netware is a trademark of Novell Inc. PACER-386 is a trademark of Laser Digital Inc.*

**Laser Digital Inc.**
1024 Morse Ave., Sunnyvale, CA 94086
Toll Free Tel: (800) 826-4225
Calif. Tel: (408) 747-1966 Fax: (408) 747-1971

CIRCLE 536 ON READER SERVICE CARD

copyrighted material

# WIRED TO THE WORLD

Electronic mail is the telex of the PC age. Oblivious to time zones and geographical barriers, it zaps everything from short messages to critical spreadsheet data across the phone lines, delivering them to the receiver instantly. Business users love that speed, and they've signed on to e-mail by the hundreds of thousands.

Until a few years ago, e-mail choices were limited. There was MCI Mail, and there was Western Union's EasyLink. Now the range of choices has been broadened by the arrival of AT&T Mail and by the growth of a new kind of electronic mail designed for use inside corporations. Many of these services grew from internal e-mail systems created by companies like RCA and General Electric, which are now marketing their e-mail expertise to other corporations.

Our survey of e-mail services is designed to help you decide, on the basis of features, support, and costs, which kind of service to choose, and which vendor to go with.

E-mail's here to stay, so pick the best service and sign on.

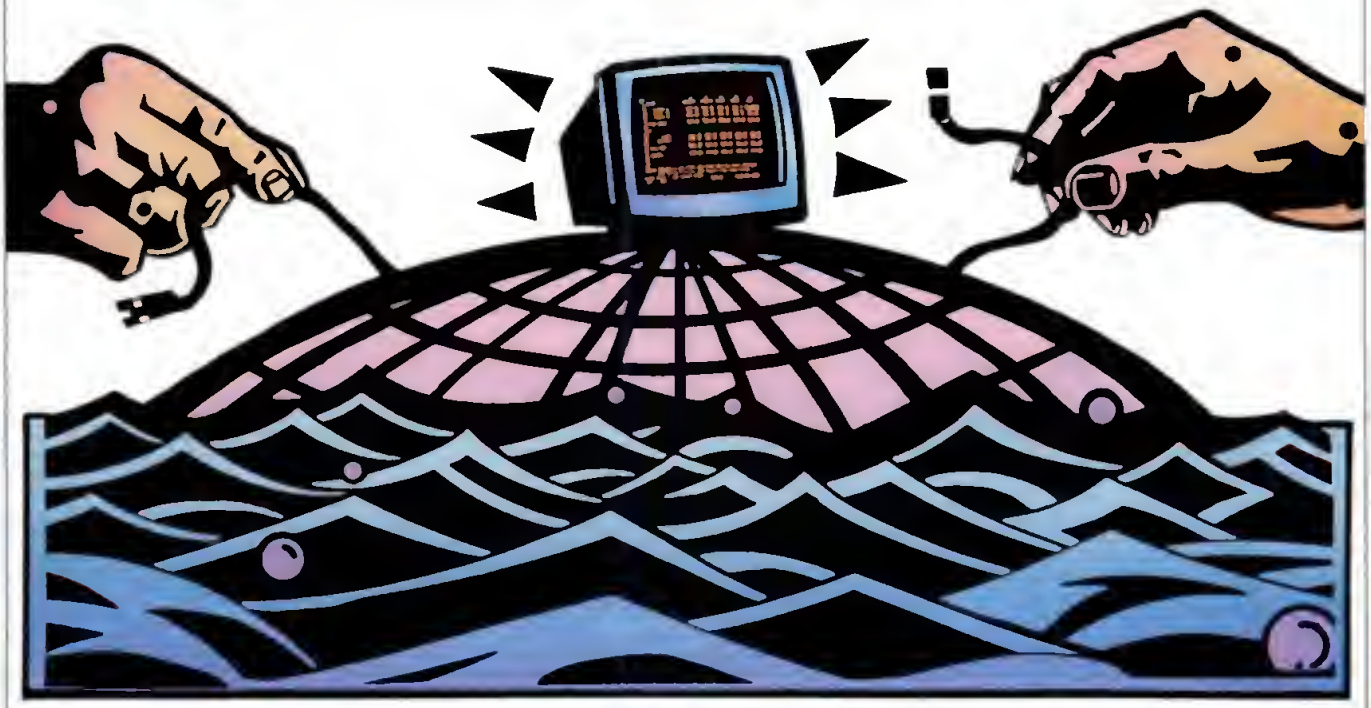


Illustration: Chris Spollen

# *Public E-Mail:* PERSON-TO-PERSON

*As the volume and scope of office communications increases, on-line database and electronic mail services vie for business patrons. Of the dedicated e-mail services, MCI Mail and EasyLink have the strongest hold on the market. Here we compare them with a new challenger—AT&T Mail.*

When the asynchronous modem hit the market, it seemed only a matter of time before microcomputers would rival the U.S. Postal Service as a means of exchanging information. After all, the desirability of sending out and picking up memos, reports, and updates with but the touch of the Return key does not have to be explained to anyone to whom convenience and speed are essential.

As a result, most popular database services, such as CompuServe and The Source, offer e-mail services, and there are many mail vendors that provide services for intracorporate communications. However, there has yet to be a dedicated e-mail service that truly dominates the others. While several potential e-mail suppliers have dropped from the market, only two systems, MCI Mail and EasyLink, have been able to hold their own. And now another service, AT&T Mail, has thrown its hat into the ring.

The three have a great deal in common. All provide subscribers with the ability to exchange messages by dialing a central system; and all provide hard-copy services to allow contact with nonsubscribers. But they begin to diverge when you examine them more closely. While MCI Mail boasts a large subscriber base—100,000 people—and ease of use, EasyLink draws on Western Union's telex background to provide access to a variety of hard-copy services, and AT&T Mail distinguishes itself by handling both text and binary data. (This ability lets users send and receive program code and spreadsheet data as well as standard text documents. To do this with MCI Mail or EasyLink requires specialized software.)

**HOOKING UP** It is a simple matter to subscribe to these services: a phone call will get you, through the U.S. mail, your various passwords and IDs, a starter kit containing manuals and other help materials, and, in the case of AT&T Mail and EasyLink, promotional material for communications software.

Western Union's *Instant Mail Manager*

and *Instant Mail Manager XPC* and AT&T's *Mail Access I* and *Mail Access II* are, according to their respective vendors, necessary to make full use of their systems. While these products are certainly very helpful since they are geared toward the specific needs of their associated services, experienced users will have little or no problem adjusting their present communications software for use with either system.

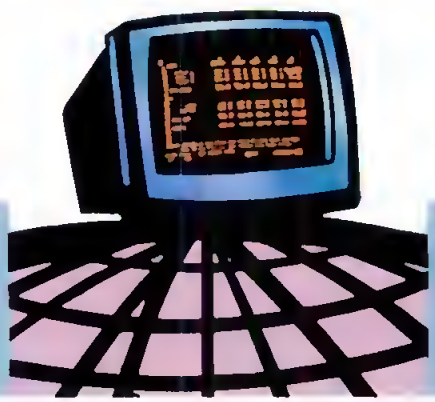
**SIGNING ON** Passwords are the most efficient way to protect the security of computer data—but unless you have a photographic memory, it is nearly impossible to remember 10 or 20 different sets of characters. Both MCI Mail and AT&T Mail have tried to simplify passwords by assigning random but pronounceable combinations of consonants and vowels. It also supplies a user name usually made up of the first initial and last name. In addition, MCI Mail includes a seven-digit MCI Mail ID that can also be used as an e-mail address and an eight-character customer number for billing purposes; AT&T includes an eight-digit account number that is not usually used during transmission.

EasyLink assigns its subscribers a nine-character ID string, a combined user name/password, and a separate eight-digit mailbox number. You need the mailbox number in order to send electronic mail.

You sign on to any of these services by calling a local, network, or WATS number via modem and then typing in your various IDs. Once you have been identified as a subscriber, you are first given a bit of system news: the effect of current holidays on paper delivery, for example, or which of the local telephone numbers may be out of service.

(MCI Mail also includes brief news headlines as a semi-advertisement for its associated Dow Jones News/Retrieval service.)

While both AT&T Mail and MCI Mail automatically notify subscribers if there is any waiting mail, EasyLink leaves it to you to inquire manually.



**MENU VERSUS COMMAND** Although on-screen menus make it simpler for beginners to use an unfamiliar or complex program, they also slow things down in a way that's very irritating to more-experienced users. To avoid this, MCI Mail and EasyLink provide both menu and command modes, while AT&T Mail provides three means of interaction. (Menu modes provide a list of commands to choose from, while command modes present only a prompt line, leaving it to the user to type in the desired command.)

However, their initial approaches vary. EasyLink dumps users immediately into its command, or prompt mode, which can be rather alarming to the uninitiated or to a casual user who hasn't memorized the commands. (This could be due to Western Union's assumption that its subscribers are using its specialized software.) It is quite simple to switch to a clearly written series

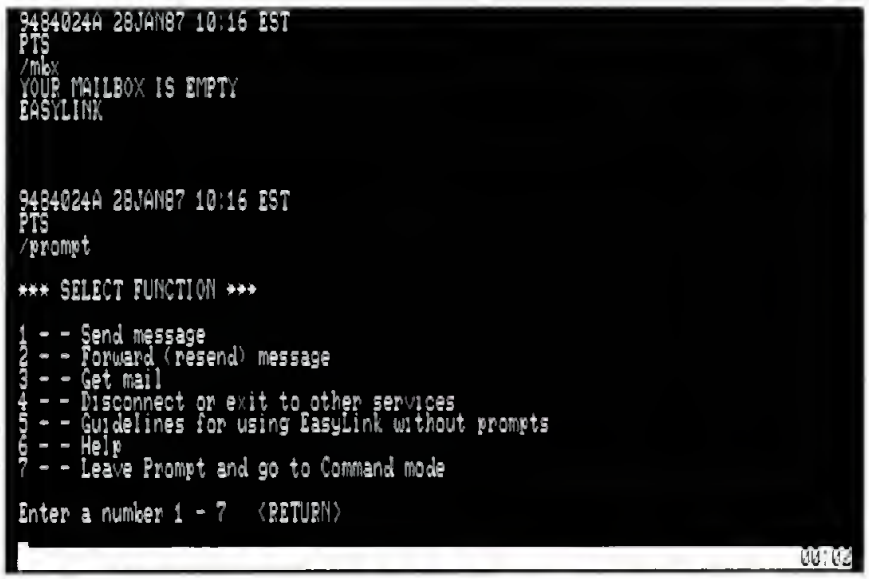
of menus by typing /PROMPT (all EasyLink commands begin with a slash); it is just as easy to switch back again.

AT&T Mail starts users off with its Full menu support, which includes listings of all available commands, together with short explanatory sentences. Experienced users can easily change to Brief mode, which simply lists all available commands on one line, or to Command mode, which suppresses all but the prompt, by using the Profile command.

Profile, which brings up a listing of the user's present configuration, also organizes such factors as line length, time zone, logos, automatic forwarding, secondary passwords, and whether or not a phone number will appear with your message. EasyLink's Acct command will also change some account information: mainly such basics as the company name and phone number of the subscriber. MCI Mail's Account command will handle system parameters such as terminal type, line and page length, time zone, and whether extra carriage returns or line feeds are needed.

MCI subscribers who wish to change their Basic (menu-based) service for the considerable advantages of Advanced status must notify MCI; there is a monthly surcharge for the latter. Advanced service not only eliminates the constant scrolling of menus but includes a variety of additional services, such as message forwarding, including text from another message, or sending electronic mail without including other recipients' names.

All three systems have thorough and well-organized help systems that are activated by typing HELP and the command in question.




*To use EasyLink's menu system, all you do is type in the command /Prompt. The system will walk you through a series of simple menus for all functions until you indicate that you want to return to the command mode.*

**E-MAIL METAPHORS** MCI Mail uses office terminology to refer to its various functions (presumably to make its thousands of corporate users feel at ease).

Incoming mail, for example, is found in your Inbox. Once the mail is read, it passes into your Desk, where it will stay for 24 hours if you have Basic service or 5 days if you have Advanced. Mail you have sent remains in your Outbox for the same period of time, as do unsent messages (Drafts).

While MCI Mail portrays its functions as boxes on your desk, AT&T Mail prefers the image of a filing cabinet. Users of its Basic service are given three folders: In, Sent, and Wastebasket. Newly arrived messages are placed in the In folder, where they will remain, if read, for 24 hours. When you create a message, it is considered to be on your "desk" until you send it; it then lands in the Sent folder. If you decide to delete a message, it is put in the Wastebasket, where it remains until you sign off.

Subscribers who need to store their message for longer than the default 24 hours can, for an additional charge, choose AT&T's premium Forms/Files option. With this, you can create your own folders (by simply typing CREATE FOLDER *folder-name*), in which you can store information indefinitely; the option also lets you create on-line questionnaire forms and mailing lists. Once you have set up your own folders, you can move messages from one to the other, copy messages into one or several folders, or delete at will.

AT&T Mail measures the contents of these folders by what it calls "storage units"; each one of these units is 7,500 characters or less per message. The Forms/Files option allows for a 30-storage-unit-per-day average; if you need more space, you are simply billed accordingly.

Western Union's EasyLink works according to somewhat less creative criteria. Incoming messages are contained in your mailbox (truncated to the command initials MBX) and then transferred to your Hold area for 3 days. Outgoing messages are sent as soon as they are created; they are not saved by the system.

All three services allow you to scan your mail before reading it. They also (unless you use MCI's Basic service) let you string commands together in command mode, making it easier to specify exactly which messages you want to read. For example, you can tell MCI Mail to SCAN INBOX SUBJECT "REVIEW" or tell AT&T Mail to SHOW IN SUBJECT "REVIEW" to find any incoming messages that feature the word *review* or you can type /READ 1-4,6 in EasyLink to read those specific messages.

**SENDING MESSAGES** Electronic mail systems encourage you to create messages and then upload them into the system before going on-line—AT&T Mail even charges a slight fee for on-line message writing—and it is admittedly a lot easier to create messages on your favorite word processor than to cope with their extremely

$400.00

$89.95

PC MAGAZINE

"Celebrity packs lots of value into word processor ... superb integrated features put Celebrity at the top of its class."

PC Magazine, March 10, 1987

# If the features are the same, which word processor would you buy?

This is the good news you've been waiting for. Celebrity™ has all the features of high priced word processors for less than one fourth the cost.

### Excellent Word Processing

Celebrity gives full word processing capabilities plus the ability to create your own commands and to perform functions with keystroke, command name or menu options. Work in up to 4 windows simultaneously. Move, transpose, copy and delete by word, line, sentence or paragraph.

### What You See Is What You Get

There's no second guessing with Celebrity. You get the same text and format on the printed page that you see on the screen.

### Easy To Learn and Easy To Use

For the infrequent user there is no need to remember special keystrokes. Celebrity can operate in plain English. With Celebrity's tutorial and help screens, you can save hours of training time. For the power user we've built in keystroke short cuts, macro and command file capabilities. Celebrity. You won't outgrow it.

### Extra Bonus

Celebrity includes a speller and thesaurus by Merriam-Webster and a full function calculator for business, science and programming. Plus an appointments and reminder calendar, a file cabinet capability, and a forms and reports system that includes mail merge functions.

### You Can't Lose

With its low price, full features and a 30-day money back guarantee, Celebrity is too good to pass up. At only $89.95, you can buy enough copies of Celebrity to cover all your home and office word processing needs. Available for IBM® PC, XT, AT and compatibles. 256K.

For immediate response call toll free to order

**1-800-272-GOOD**

In Texas or for information call

**214-239-6085**

CIRCLE 264 ON READER SERVICE CARD

IBM is a registered trademark of International Business Machines Corporation

Please send me Celebrity!

| # Copies | Price | Total |
|---|---|---|
| _____ | x $89.95 = | _____ |
| Add Shipping | + | $ 7.50 |

Texas residents add $5.51 sales tax per copy

TOTAL _____

☐ Check ☐ Money Order
☐ AMEX ☐ VISA ☐ MasterCard

Account # _____

Expires _____

Name _____

Company _____

Street Address _____

City _____

State _____ Zip _____

Phone _____

Signature _____

GOOD SOFTWARE CORP.

5429 LBJ Freeway, Suite 720 Dallas, TX 75240

awkward on-line editing systems. However, at one time or another, most users will need to go in and type a short memo or immediately answer a query on-line.

There is not a great deal to learn about sending an EasyLink electronic message. At the command prompt, you simply type the mailbox number of the recipient, followed by a + symbol (which signals that you have no more addresses to enter). You can then upload or type in any message you wish. You signal that the message is completed by starting a new line with either LLLL (to indicate that you wish the message sent) or MMMM (to indicate that you also want to disconnect). EasyLink's text-editing facilities are practically nonexistent. You can go back and fix an error only if you are still on the same line; if you've already hit Return, you have the choice of either sending the message with the mistake or canceling the whole thing and starting over.

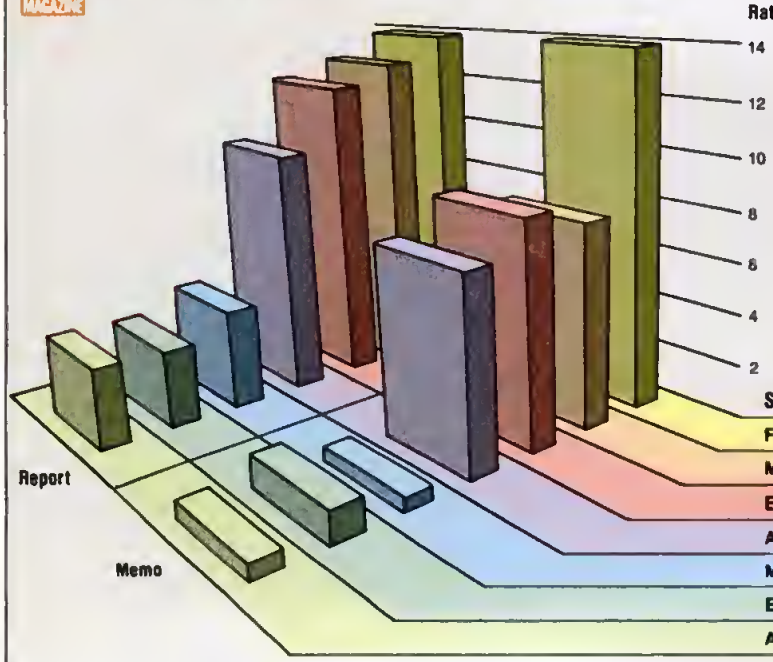
And if you don't know the eight-digit mailbox number of your intended recipient, you may be in trouble. Unlike AT&T Mail and MCI Mail, EasyLink has no direct search feature for subscriber names. Instead, you must leave EasyLink's mail function by typing /EXIT (/QUIT will disconnect you completely) and entering the Directory Information Service. (The Exit command also gives you access to Western Union's database services.) At this point, you can search on either the company name (you must also know what state the company is in), the mailbox number (assuming you need to find whose box it is), or the telex answerback code. There is no way to search for a person's name. If a subscriber has both an EasyLink and telex number, the system will only give you the telex number; however, messages addressed to that number will be sent to the subscriber's EasyLink mailbox.

Unlike AT&T Mail and MCI Mail, EasyLink has no direct search feature for subscriber names.

MCI Mail and AT&T Mail use a Create command to indicate that you want to start a message. You are given a To: prompt, at which point you type the name or ID number of the recipient. The systems then institute a search to check whether the recipient is registered as a subscriber; if MCI Mail can't find the name, it will give you the choice of canceling the message or sending a hardcopy message; AT&T Mail suggests that you type /ADDRESS to indicate that you want to send a paper message. (MCI also has a separate Find command if you simply want to find out if somebody is a subscriber.) The To: prompt will repeat until you have finished typing in all your names; it is followed by CC: and Subject lines, both of which can be skipped.

**CLUMSY EDITING** Once you have finished uploading or typing in your message, both services allow you to go back and make changes—in approximately the same adequate but awkward manner. MCI

## Public E-Mail Rate Comparison Chart




These rates are based on the following criteria and assumptions: The memo is 50 words (250 characters), typed while the user was on-line. The report is 20 pages (5,000 words or 25,000 characters), uploaded from a prepared file. It took 2 minutes to type the memo and 5 minutes 45 seconds to upload the report. The user is calling from a local number. Annual membership rates are not included. Federal Express charges are based on a package that is being picked up from the sender.

| Service | Report | Memo |
|---|---|---|
| Federal Express | $14.00 | $14.00 |
| MCI Mail Overnight | $13.00 | $8.00 |
| EasyLink Overnight | $12.30 | $8.75 |
| AT&T Mail Overnight | $9.90 | $7.50 |
| MCI Mail | $4.00 | $.45 |
| EasyLink | $3.08 | $1.20 |
| AT&T Mail | $3.20 | $.60 |

© Dialog Information Services, Inc. 1986

# How to get into the library at 3 a.m.

If you can't quite squeeze your research into a regular 9-5 day, you need KNOWLEDGE INDEX.℠ In minutes, you'll locate the articles you need from millions contained in over 10,000 journals covering all disciplines. Best of all, you use KNOWLEDGE INDEX nights and weekends, when the library may be closed.

No special equipment or programming skills are required. All you need is a personal computer and a modem to access many of the same online databases used in libraries.

But convenience isn't the only advantage. We'll automatically charge your VISA, Mastercard, or American Express account, so paying for KNOWLEDGE INDEX couldn't be easier. And since you use Knowledge Index during the hours libraries and businesses don't, you save money.

Sign up and receive $10 off the start up fee. Forget about rushing to the library before it closes. Just get KNOWLEDGE INDEX. An idea that's long overdue.

For information, call 800-3-Dialog. Or write: KNOWLEDGE INDEX, Dialog Information Services, Inc., 3460 Hillview Ave., Palo Alto, CA 94304.

DIALOG®
A subsidiary of Lockheed Corp.

**SAVE $10 NOW.** Sign up for KNOWLEDGE INDEX now* and pay only a $25 start up fee (regularly $35). Fee plus connect-time charges of 40¢ per minute will be billed to your credit card (KNOWLEDGE INDEX is available only through these credit cards)

☐ VISA ☐ Mastercard ☐ American Express

Acc. No. _____ Exp. Date _____

Signature _____

Name (please print) _____

Address _____

City _____ State _____ Zip _____

Telephone (Day) _____

*KNOWLEDGE INDEX User's Workbook, password and contract will be sent immediately. Contract must be returned within 30 days to keep password active.

**KNOWLEDGE INDEX.** Dialog Information Services, 3460 Hillview Ave., Palo Alto, CA 94304

KNOWLEDGE INDEX℠

INFORMATION — ONLINE ALL NIGHT

CIRCLE 331 ON READER SERVICE CARD

# Family Affair

***Choose from a family of 4 modems -- the 1200 baud modems at $99 & $119, and the 2400 baud modems at $209 & $229 -- that offer unbelievably great performances and make you wonder why everyone else charges so much!***

**2400 Baud Modems**
**Internal Modem:** Modular Phone Cable, Mounting Bracket, COM1 or COM2, Asynchronous Communications
**External Modem:** AC Power Adapter, Stand Alone Enclosure, Status Indicator LEDs, Asynchronous Or Synchronous Communications
**Both Units:** Hayes Compatible Command Set, CCITT V 22/V.22 bis and Bell 212A Compatible, 110/300/600/1200/2400 bps Operation, Automatic Adaptive Equalization, IBM PC Hardware Compatible, Two RJ-11C Jacks (Alternate Voice/Data Communication)

**1200 Baud Modems**
**Internal Modem:** Two Jacks, Line Input and Phone Jack, RS-232 Port COM1 or COM2, Speaker with Volume Control
**External Modem:** 8 Status Indicator Lamps, Snap Off Front Switch Panel, Speaker with Volume Control
**Both Units:** Bell 103/212A 300/1200 Baud, Fully Hayes "AT" Command Set Compatible, Modular Phone Cord, PC-TALK III Software

## Pedigree

You can be sure that the Qubie' family of modems are of good stock. Our latest editions, the 2400I Internal Modem Card and 2400E External Modem are proof positive what good breeding can accomplish. These state-of-the-art modems are CCITT V.22/V.22 bis, Bell 212A Compatible, and 2400/1200/600/300/110 bps.

Our modems are fully compatible with all Hayes software commands. Software packages such as Crosstalk, Smartcom II, and Sidekick will work flawlessly. Both the 2400I and 2400E are equipped with Automatic Adaptive Equalization which automatically adjusts to the telephone line and increases performance and decreases the error rate.

The 2400I Internal Modem Card fits into any expansion slot, as it is a compact half-card modem. It's designed specifically to operate in the IBM Personal Computer PC/XT/AT family and compatible computers. The rear panel has two RJ-11C modular telephone jacks for the telephone line and the telephone set. The modem can be set for COM1 or COM2. The 2400I modem allows asynchronous communications with remote computers and other data terminal equipment over standard voice grade telephone lines. The 2400E External Modem offers the user asynchronous or synchronous communications. The 2400E is enclosed in a slimline plastic enclosure. The front panel displays the eight modem status indicator lights. It works on any computer or terminal with an RS-232C serial port.

## Siblings

Not to be forgotten are our 300/1200 baud modems. The Internal Modem Card is designed for the PC, PC/XT and most compatibles; it occupies one full length slot and the internal speaker lets you know the call progress. An RS-232 serial port is standard, COM1 or COM2; you can use the port for other peripherals when the modem is not being used. Our External stand alone modem can be used with any computer or terminal which utilizes an RS-232C serial port. It also comes with 8 status indicator lamps and a snap off front panel that allows for quick setting of the switches for all types of communication packages. At $99 and $119, these are the best price/performance modems for most communications.

## What's In A (Sur)Name?

Everything if it's a Qubie' supported product. Our **30-Day No Risk Guarantee**, our one year warranty, **48-hour turnaround** and **Federal Express** on warranty repairs, and our **Technical Support Line** open Saturdays from 8-11 am PTZ, are proof that our products and service are of the highest quality.

### No Risk Guarantee

If you are not completely satisfied with your purchase, you may return it within 30 days of purchase for a complete refund, including the cost to send it back. If you can get any dealer or competitor to give you the same **No Risk Guarantee**, buy both and return the one you don't like.

VISA

For fastest delivery, send cashier's check, money order, or order by MasterCard/Visa. Personal Checks allow 18 days to clear. Company purchase orders accepted, call for prior authorization. California residents add 6% sales tax

**QUBIE'**

Department P
507 Calle San Pablo
Camarillo, California 93010

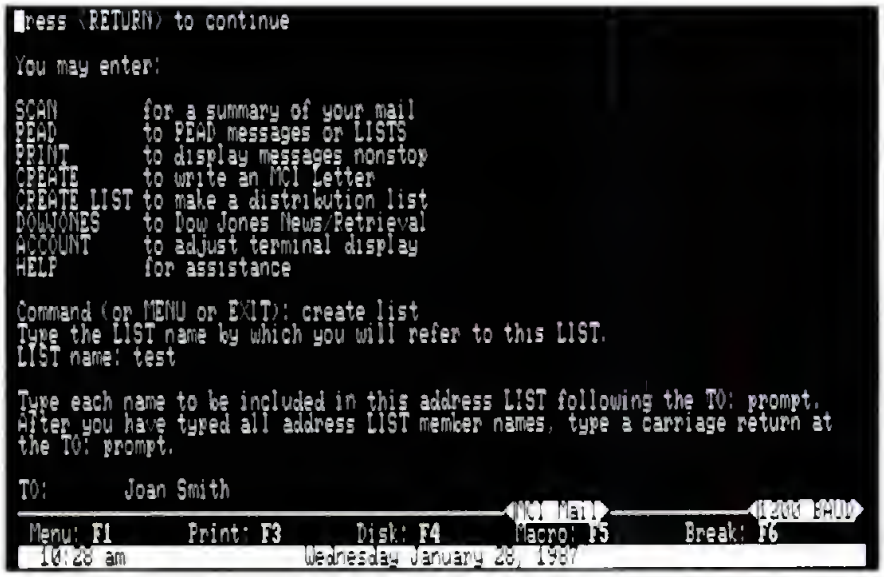
Inside California
**805-987-9741**

Outside California
**800-821-4479**

London (01) 223-4569
Paris (01) 321-5316
Sydney (02) 579-3322
Canada (403) 434-9444

Hours: M - F 8 am - 5 pm PTZ  Sat 8 am - 11 am PTZ

CIRCLE 236 ON READER SERVICE CARD




*MCI Mail's Basic service provides users with complete command menus. In this case, a mail list is being created; the system will check each time to make sure the person you're addressing is listed as a subscriber. If he's not, you can type in an address for regular mail delivery.*

Mail places you in a separate edit mode in which you can delete, make changes (by specifying which line and phrase you wish to change and typing in a replacement), or add lines to the text or address. Any changes you make become permanent only when you leave the editing function (and you can choose to have the changes ignored). AT&T Mail has a variety of edit functions that you can access directly, without entering a separate mode. It contains all of MCI Mail's editing features plus a few more, such as Locate, which will find any character string in your message, or Change, which will perform one of those handy search-and-replace tasks.

The three systems offer you many ways to monitor and personalize your electronic messages. For example, all three services have a return receipt feature that notifies you when a message has been received (only AT&T Mail allows the recipient to choose not to receive the message). EasyLink provides an ATTN: line when desired, while MCI Mail and AT&T Mail have separate memo and letter formats that govern whether or not the recipient is also shown the names of any other subscribers receiving the message.

AT&T Mail also has interesting auto-answer and auto-response features. The former allows you to return an automatic answer message to anyone who sends you e-mail, while the latter enables you to select one or more response messages from a folder and have the service send it as an answer to anyone whose message subject matches yours.

If you want to send something other than electronic mail, both AT&T Mail and MCI Mail give you several options: they include regular U.S. Mail, telex, overnight and 4-hour courier, and (in the case of AT&T) C.O.D.

They also furnish a variety of formats and choices: for example, both allow you to register logos or signatures with the company in order to personalize paper mail. MCI Mail allows Basic service users to register one letterhead and one signature while Advanced service users can register up to 15, with one listed as the standard AT&T Mail simply charges users per graphic.

EasyLink's lack of e-mail features is partly redeemed by its variety of hard-copy delivery options, no doubt a result of Western Union's heavy telex background. Subscribers are able to send letters, telexes, Mailgrams, telegrams, cablegrams, or Express documents. Instead of the EasyLink mailbox number, you simply

No matter how good the system, electronic mail is just plain useless if your intended recipients don't check their mailboxes.

type in the appropriate identification coding (for example, the telex number) or the EasyLink service code (/PMS for a telegram or /ZIP for a Mailgram), along with your recipient's address. EasyLink does make things a bit easier by allowing you to set up two-digit codes for frequently used hard-copy addresses; these codes can include any specific mailing instructions. You can also give an alternate address, which will be used after EasyLink has made eight attempts to deliver the message.

**E-MAIL FOR NONSUBSCRIBERS** No matter how good the system, electronic mail is just plain useless if your intended recipients don't check their mailboxes. All three systems provide ways around this. EasyLink is the most direct: it simply waits 10 days and then sends the message as a Mailgram. MCI Mail features a service called Mail Alert, through which, for an extra $1 per message, subscribers can have an MCI Mail operator call the recipient to notify him that a message is waiting.

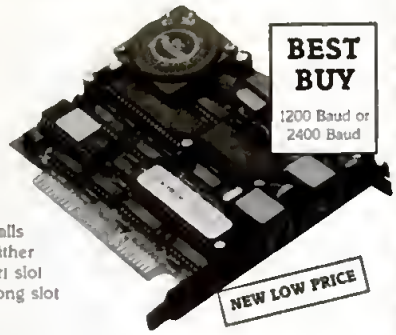
However, AT&T Mail wins the prize with its Mail Talk service, which lets you call in and listen to a computerized voice "read" any or all of your messages. You give directions to the service by hitting specific phone buttons; explanations are given in a "female" voice, messages are read in a "male" voice. The articulation is quite clear, although somewhat staccato, and since verbal emphasis seems to depend specifically on punctuation, it has a

# Simply Put: THE highest quality and best values in IBM PC/XT, AT compatible products on the market today!

# THE™

**Thompson, Harriman and Edwards Computer Products Company, Ltd.**

## THE™ IBM/Hayes Compatible COMMUNICATION




### THE™ Internal Modems

Features auto answer, dial and re-dial w/built-in speaker. FREE communication software.

**1200 BAUD INTERNAL** **$88.00***
Retail Price $148 75

**2400 BAUD INTERNAL** **$197.00***
Retail price $332 00

### THE™ External Modems

These self-testing 1200 and 2400 Baud modems come with auto answer, auto dial, re-dial, and built-in speaker with volume control.

**1200 BAUD EXTERNAL** **$119.00***
NEW LOW PRICE
Retail Price $161 25

**2400 BAUD EXTERNAL** **$220.00***
Retail Price $346 75

## THE™ IBM PC/XT/AT Compatible VIDEO CARDS

### THE™ H720 MONOCHROME

This graphics card w/80x25 COL capability and parallel printer port w/light pen interface is 100% IBM™ and Hercules™ compatible.
Retail Price $91 25 **$69.00***

### THE™ EGA PLUS ENHANCED GRAPHICS

100% IBM™ EGA/Hercules Graphics/ CGA/MDA compatible, EGA Plus is perfect for high resolution graphics w/256K standard
Retail Price $300 64 **$165.00***

### THE™ COLOR CARD

Features composite color & mono video port, 320x200 color and 640x200 B&W RGB port with light pen interface. 100% IBM™ color card compatible
Retail Price $75 00 **$60.00***

## THE™ IBM PC/XT/AT Compatible ENHANCEMENT

### THE™ MULTI I/O

100% AST I/O+ compatible w/senal, parallel and game port standard, second senal port optional
Retail Price $75 00 **$60.00***

### THE™ 2MB EMS RAM CARD

Meets Lotus™/Intel™ specs, compatible with Microsoft™ Windows, Lotus, Framework and more RAMdisk and print spooler, software included w/0K
Retail Price $172 00 **$99.00***

### THE™ MULTI 384

100% AST™ SixPack compatible Capable of 0-384K additional memory, w/R232-senal port, parallel and game port, clock/calendar w/rechargeable battery backup Never needs replacing w/0K
Retail Price $90 00 **$67.00***

## THE™ IBM/PC/XT/AT Compatible SUBSYSTEMS

### THE™ 20MB HARD DISK SUBSYSTEM

This half height internal 20MB disk drive comes with a controller card, connecting cables and manual. Retail Price $458 75

20MB Hard Disk Subsystem **$347.00***

### THE™ 20 + 20 HARD DISK AND TAPE BACK UP

The 20MB streaming tape packaged together with our 20MB Hard Disk allows you to backup the entire contents of your 20MB hard disk in minutes.
Retail Price $980 00

20MB Disk 20MB Tape Back up **$699.00***

### THE™ 20MB HARD DISK ON A CARD

This 3.5" 20MB hard disk and controller on a single card features simple plug-in and go installation and disk slot saving efficiency.
Retail price $500 00

20MB on an Internal Board **$375.00***

## All THE™ products in this special event are offered thru PC Network

***All prices in this offer are listed wholesale, members pay wholesale + 8% and shipping**

**To order Call Toll Free** Mon. - Fri. **8am-7pm** Sat. **9am-5pm** CST

Validation # AB67 **(800) 621-SAVE** IN ILLINOIS (312) 280-0002

**See Coupon for Mail-In Membership on Next Page**

## THE™ BACKED BY A $90 MILLION COMPUTER PRODUCTS COMPANY CARE PACKAGE

THE™ backs every product with a

**45 DAY MONEY BACK GUARANTEE**

and a

**1 YEAR WARRANTY ON PARTS AND LABOR**

MasterCard VISA

All Prices are Subject to Change Without Notice
All products are Subject to Availability

TM—Registered Trademarks of Ast Research/Compaq/Hayes/Hercules/IBM/ Intel/Lotus/Microsoft/PC Network.

THE COMPUTER YOU CAN'T AFFORD NOT TO BUY!!!

# $444.00

CERTIFIED 100% IBM COMPATIBLE

**THE™ PC+**
**256K RAM**
**360K Drive**
**Turbo Speed**
**"AT" Keyboard**

## TIME, BUSINESS WEEK and the WALL STREET JOURNAL CAN'T BE WRONG!!!

The world doesn't need a better mousetrap, it needs an IBM PC for under $500.00. That's our philosophy at **THE.™** An affiliate of one of the nation's largest computer companies, **THE™** introduced it's **PC+** last year and set the industry on fire! **THE™ PC+'s** introduction made front page news. *"A top quality IBM clone costing less than a VCR, could signal the start of the computer in every home."* **THE™** was featured in THE WALL STREET JOURNAL, TIME, BUSINESS WEEK, CBS NEWS, INFOWORLD, PC MAGAZINE and PC WORLD. Computer Shopper Magazine's readers, **the most cost conscious buyers**

***"...the World doesn't need a better mousetrap, it needs an IBM PC for under $500..."***

**In the field, voted us BUY OF THE YEAR!!** Apple invented the home computer, IBM standardized it, but **THE™** made it affordable.

***A CLONE BETTER THAN THE ORIGINAL?***

It's true! **THE™ PC+** is not only 100% IBM compatible and built almost entirely of parts made by IBM's own suppliers, but it's better in almost every respect!! **SPEED: THE™ PC+ is *TWICE* as fast! POWER: THE™ PC+** has 8 slots and 150 Watt power supply, you can plug many more options and accessories into **THE™ PC+** than a standard IBM. **KEYBOARD: THE™ PC+** uses a keyboard that IBM made for its AT unit, costing $1,000's more.

## 45 Day Money Back Guarantee

**THE™ PC+** is so well built and so compatible that we offer you a 45 Day Money Back Guarantee. If you don't like it for any reason, return it for a refund, no questions asked. We also back the machine with a FULL YEAR Parts AND Labor Warranty, not the standard IBM 90 day policy.

PC MAGAZINE — *"THE™ PC+ is well built and has enough company support behind it to make it a very attractive alternative to higher priced competition."*

PC WORLD — *"THE's™ bottom line? The PC+ is a highly compatible clone worthy of consideration..."*

Computer Dealer MAGAZINE — *"...the unit became the preferred computer in our office, which has several name brands as possible alternatives..."*

# THE™

**Thompson, Harriman and Edwards Computer Products Company Ltd.**

**Dealer Inquiries Call THE™ at (312) 642-9626, 319 West Ontario Street, Chicago, Illinois 60610-9934**

# PC NETWORK YOUR #1 SOURCE FOR IBM

## BUY HARDWARE AND SOFTWARE AT WHOLESALE +8%, AND GET 14-30 DAY SOFTWARE RENTALS†...

### MONITORS

**MAGNAVOX 13" COLOR RGB MONITOR**

**$275.00***

| | | |
|---|---|---|
| **Amdek** | *Video 310A Amber* | $139.00* |
| **Amdek** | *Color 722 NEW! Enhanced* | 449.00* |
| **Magnavox** | *Amber IBM Type TTL* | 85.00* |
| **Princeton** | *HX-12 RGB* | 369.00* |
| **Princeton** | *Max-12E* | 138.00* |
| **Princeton** | *HX-12E RGB* | 445.00* |
| **Magnavox** | *14" Multimode* | 489.00* |
| **Magnavox** | *14" EGA w/swivel base* | 435.00* |
| **THI** | *12" Dual Frequency Amber* | 85.00* |

**NEC JC-1401 MULTISYNC RGB MONITOR**

High Res Color **$530.00***

**TOLL FREE (800) 621-SAVE**

(Orders-Membership and Advice!) **AB67**

In Illinois call (312) 280-0002

Your Membership Validation Number

You can validate your membership number and, if you wish, place your first money-saving order by phone using your VISA, MASTERCARD or AMERICAN EXPRESS. Our knowledgeable sales consultants are on duty:

| MON.-FRI. (CST) | SATURDAY |
|---|---|
| 8am-7pm | 9am-5pm |

PERSONAL COMPUTER NETWORK
320 West Ohio
Chicago, Illinois 60610-9934
FOR CUSTOMER SERVICE AND ORDER STATUS
CALL: (312) 280-1967 Mon.-Fri. 8:30am-4:30pm

### PC NETWORK MEMBERSHIP APPLICATION

**YES!** Please enroll me as a member in the PC NETWORK™ and send my catalog featuring thousands of computer products, all at just 8% above DEALER WHOLESALE PRICES. I will also receive "THE PRINTOUT" a special periodic update on merchandise at prices BELOW even those in my wholesale catalog and all the other exclusive, money-saving services available to Members. I am under no obligation to buy anything. My complete satisfaction is guaranteed.

Please (✓) all boxes that apply **B67**

| | 1 Year | 2 Year |
|---|---|---|
| •Basic Membership | | |
| With 14 Days Rental | $8 ☐ | $15 ☐ |
| Business Software Rental Library | $25 | add'l per year |
| Games Software Rental Library | $10 | add'l per year |
| •Special V.I.P. Membership | 1 Year | 2 Year |
| With 30 Days Rental | $15 ☐ | $25 ☐ |
| BOTH Business and Game Software Rental Libraries | $30 | add'l per year |

☐Bill My Credit Card ☐VISA, ☐MasterCard ☐Amencan Express

Account Number ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Exp Date mon ____ yr ____

☐Check or Money Order Enclosed for $ ____

Name ____

Address ____ Apt No ____

City ____ State ____ Zip ____

Telephone ( ) ____

My Computer(s) is ☐IBM ☐IBM XT ☐IBM AT ☐Apple II ☐Macintosh Other ____

Signature ____

(Signature required to validate membership)

Copyright 1986 PC NETWORK INC

**LISTED BELOW ARE SOME OF THE OVER 30,000 PRODUCTS AVAILABLE AT OUR EVERYDAY LOW PRICES!**

### GAMES & EDUCATIONAL SOFTWARE

Please add $1 shipping/handling for each title listed below

| | | Wholesale |
|---|---|---|
| **Activision** | *Hacker II or Championship Baseball* | $21.25* |
| **Activision** | *Shanghai* | 32.20* |
| **Bluechip** | *Millionaire Oil Baron or Tycoon* | 32.00* |
| **Broderbund** | *Where in the World is Carmen San Diego?* | 20.00* |
| **Broderbund** | *Type!* | 28.50* |
| **Broderbund** | *The Print Shop* | 30.00* |
| **Broderbund** | *The Print Shop Graphics Lib 1 or 2* | 18.90* |
| **Davidson** | *Math Blaster, Word Attack!* | 28.00* |
| **Electronic Arts** | *Music Construction Set* | 15.97* |
| **Electronic Arts** | *The Chessmaster 2000* | 28.97* |
| **Electronic Arts** | *Starflight, World Tour Golf* | 32.97* |
| **Epyx** | *Pit Stop II, Temple of Apshai Trilogy* | 21.00* |
| **Hayden** | *Sargon III* | 26.00* |
| **Hayden** | *Computer Novel Construction Set* | 29.97* |
| **Infocom** | *Ballyhoo, Foobitzky or Trinity* | 20.00* |
| **Infocom** | *Bureaucracy, Hollywood Hijinx or Witness* | 21.25* |
| ▶ **Infocom** | *Zork Trilogy* | 30.95* |
| ▶ **Learning Company** | *Museum Parade or Reader Rabbit* | 21.25* |
| **Microprose** | *Conflict in Vietnam or Crusade in Europe* | $21.25* |
| **Microprose** | *Solo Flight, F-15 Eagle or Silent Service* | 18.50* |
| **Microsoft** | *Flight Simulator 2.0* | 27.00* |
| **Mindscape** | *Indiana Jones, Voodoo Island, Sub Mission* | 21.25* |
| **Mindscape** | *Balance of Power or Defender of the Crown* | 26.00* |
| **Mindscape** | *The Perfect Score SAT* | 37.25* |
| **Sierra On-Line** | *Black Cauldron* | 21.25* |
| **Sierra On-Line** | *King's Quest III or Space Quest* | 26.00* |
| **Simon & Schuster** | *Typing Tutor III* | 28.25* |
| **Spectrum Holobyte** | *Falcon, Orbiter, Telestar Level 1 or 2* | 24.00* |
| **Spectrum Holobyte** | *The Art Studio or Wilderness NEW!* | 24.00* |
| **Spinnaker** | *Delta Drawing, In Search of* | 20.75* |
| **Spinnaker** | *One Minute Manager* | 15.00* |
| **Springboard** | *Fraction Factory, Make a Match* | 17.97* |
| **Springboard** | *Certificate Maker* | 31.70* |
| **Springboard** | *Newsroom Pro* | 64.50* |
| **Sublogic** | *Jet* | 27.00* |
| **Sublogic** | *Flight Simulator Scenery Disks 1-6* | 24.00* |

### BUSINESS SOFTWARE

Please add $2.00 shipping/handling for each title listed below

| | | |
|---|---|---|
| **ANSA** | *Paradox* | $410.00* |
| **Ashton-Tate** | *DBase III Plus or Framework II* | 270.00* |
| **Ashton-Tate** | *Rapid File* | 227.25* |
| **Borland** | *Superkey or Turbo Graphics Toolbox* | 38.00* |
| **Borland** | *Reflex* | 60.00* |
| **Borland** | *Turbo Basic, Turbo 'C' or Eureka* | 54.00* |
| **Central Point** | *Copy II PC, PC Tools* | 20.00* |
| **Computer Associates** | *Supercalc IV or Super Project Plus* | 255.00* |
| **DAC** | *Easy Accounting* | 38.00* |
| **DAC** | *Easy Bonus Pack* | 79.00* |
| **Enertronics** | *Enerqraphics 2.0* | 275.00* |
| **Executive Systems** | *XTREE* | 27.00* |
| **PGS** | *Fastback* | 65.00* |
| **Peak Software** | *Sideways* | 34.00* |
| **Harvard** | *Presentation Graphics* | 209.00* |
| **Harvard** | *Total Project Manager II NEW!* | 215.00* |
| **Hayes** | *Smartcom II—New VT 100 Emulator* | 68.00* |
| **Human Edge** | *Mind Prober or Mind Over Minor* | 24.00* |
| ▶ **Intuit** | *Quicken* | 30.00* |
| **Lifetree** | *Volkswriter III* | 139.00* |
| **Lotus Development** | *Lotus 1-2-3 Ver. 2.01* | 285.00* |
| ▶ **Lotus Development** | *Hal Report Writer* | 91.75* |
| **Lotus Development** | *Metro* | 65.28* |
| ▶ **Lotus Development** | *Freelance + Manuscript Measure* | 320.00* |
| **Mecs** | **Managing Your Money** | $99.99* |
| **Meridian Technology** | *Carbon Copy* | 106.00* |
| **MDBS** | ***Knowledgeman II Bonus Pack*** | 285.00* |
| **MicroPro** | ***Wordstar 2000 + Network NEW!*** | 327.00* |
| **MicroSim** | *R Base 5000* | 235.00* |
| **MicroSim** | *R Base (Clout 2)* | 189.25* |
| **Microsoft** | *C Compiler* | 240.00* |
| **Microsoft** | *Word—Latest Version 3.1* | 229.00* |
| **Microsoft** | *Multiplan* | 98.00* |
| **Microsoft** | *Quick Basic Vers. 2.0, Windows* | 84.00* |
| **Microsoft** | *Crosstalk XVI* | 85.00* |
| **Migent** | *Ability or In House Accountant NEW!* | 85.00* |
| **Monogram** | *Dollars & Sense w/Forecast* | 69.00* |
| ▶ **Multimate** | *Advantage or Multimate Executive NEW!* | 240.00* |
| **Multimate** | *Multimate* | 230.00* |
| **Nantucket** | *Clipper DBase III Compiler* | 510.00* |
| **Norton** | *Commander* | 33.00* |
| **Norton** | *Norton Utilities 3.2* | 45.00* |
| **Paperback Software** | *VP Planner, VP Expert or VP Info* | 48.00* |
| **Satellite Software** | *Word Perfect 4.2* | 185.00* |
| ▶ **Softlogic Solution** | *Qubi, Double DOS or Disk Optimizer* | 25.00* |
| **Software Publishing** | *PFS: First Choice* | 95.00* |
| **Software Publishing** | *PFS: Professional Plan or File* | 127.00* |
| **Veoture** | *Desktop Publishing* | 560.00* |

Please add shipping/handling charges found in italics next to price.

### COMPLETE SYSTEMS

| | | | |
|---|---|---|---|
| **Apple** | *Mac Apple IIc/IIe MS DOS Keyboard* | CALL | |
| **AT&T** | *6300 PC CPU w/MS DOS GW Basic 640K Floppy 1 Serial 1 Parallel/Mono Monitor/Keyboard* | $1,180.00* | (24.84) |
| **COMPAQ** | *Hard Disk 20MB Portable 1 Floppy w/256K* | 1,800.00* | (38.88) |
| **COMPAQ** | *DeskPro Hard Disk 20MB w/256K/ 2 Floppy* | 1,537.00* | (39.42) |
| ▶ **IBM** | *XT Base System 256K/1 Floppy/Clock* | 1,075.00* | (23.22) |
| ▶ **IBM** | *XT Enhanced System 20MB Hard Disk* | 1,337.00* | (28.88) |
| **IBM** | *PC AT Model 339* | 3,750.00* | (81.00) |
| **IBM** | *PC AT Base Unit 1.2MB Floppy w/256K* | 2,204.00* | (47.61) |

### DISK DRIVES & CONTROLLERS

| | | | |
|---|---|---|---|
| **IOmega** | *Bernoulli Box/Dual MB Dr* | $1,710.00* | (36.94) |
| ▶ **PC Network** | *1.0MB Internal 1/2 Height Autoboot Driver by Seagate or Shugart* | 288.00* | (6.24) |
| **PC Network** | *10MB Tape Backup Same Unit used in Compaq's DeskPro* | 348.00* | (7.34) |
| **PC Network** | *20MB Tape Backup Half Height w/controller* | 520.00* | (11.23) |
| ▶ **PC Network** | *Half Height DS DD Drive* | 78.00* | (2.00) |
| **THI** | ***20MB** Hard Disk Card* | 279.00* | (6.10) |
| ▶ **THI** | ***20 + 20** Storage System* | 668.00* | (14.10) |
| | *20MB Tape Backup Combo* | | |
| ▶ **THI** | ***20MB** 20MB Internal 1/2 Height Autoboot Driver by Seagate or Microscience* | 347.00* | (7.50) |

### MEMORY CHIPS

All chips guaranteed for life

| | | |
|---|---|---|
| ▶ **64K Memory Upgrade Kits** | $7.79* | (.50) |
| ▶ **64K Dynamic Ram Chips** (Each) | 1.00* | (.50) |
| ▶ **256K Dynamic Ram Chips** (Each) | 2.90* | (1.50) |
| ▶ **128K AT Mother Board Chips** (Each) | 2.80* | (1.50) |
| ▶ **Intel** | 109.00* | (2.50) |

### MODEMS

| | | |
|---|---|---|
| ▶ **Hayes** | $525.00* | (11.34) |
| **Hayes** *Smartmodem 1200BPS w/new Smartcom II VT 100 Emulator* | 215.00* | (6.80) |
| **Hayes** *Smartmodem 300* | 125.00* | (2.70) |
| **Migent** *Pocket Modem* | 179.00* | (3.87) |
| **U.S. Robotics** *Courier 2400BPS modem* | 345.00* | (7.45) |
| **ALL THI MODEMS ARE 100% HAYES COMPATIBLE** | | |
| ▶ **THI** *"1200 Com External* | 119.00* | (2.58) |
| ▶ **THI** *"2400 Com External* | 220.00* | (4.75) |
| ▶ **THI** *"1200 Com Internal w/ Free Software* | 89.00* | (1.90) |
| **THI** *"2400 Com Internal w/ Free Software* | 197.00* | (4.25) |

### MONITORS

| | | |
|---|---|---|
| **Amdek** | *Video 310A Amber TTL* | $139.00* (3.00) |
| **Amdek** | *Color 600 High Res RGB* | 385.00* (7.66) |
| **Amdek** | *Color 722 NEW! Enhanced* | 449.00* (9.70) |
| **Magnavox** | *Amber IBM Type TTL* | 85.00* (2.50) |
| **Magnavox** | *13" RGB Color 640x240* | 275.00* (5.94) |
| **Magnavox** | *14" Multimode Monitor* | 489.00* (10.56) |
| **Magnavox** | *14" EGA Monitor w/swivel base* | 435.00* (9.40) |
| **NEC** | *JC 1401 Multisync RGB Color* | 530.00* (11.45) |
| **Princeton** | *HX 12 RGB Monitor* | 269.00* (7.98) |
| **Princeton** | *HX 12E RGB Monitor* | 445.00* (9.61) |
| **Princeton** | *MAX 12E* | 138.00* (2.98) |

*Supports Either Mono or RGB Cards*

### HARDWARE

### MULTIFUNCTION CARDS

| | | |
|---|---|---|
| ▶ **AST** | *Advantage for AT* | $325.00* (7.02) |
| **AST** | *SixPakPlus Premium w 256K of 1MB* | 254.00* (5.49) |
| ▶ **AST** | *SixPakPlus w/ 0-64K* | 139.00* (3.00) |
| **AST** | *I/O Mini 1 Ser 1 Clk* | 109.00* (2.50) |
| ▶ **Orchid** | *Cornputer* | 220.00* (4.75) |
| **Orchid** | *Tiny Turbo 286* | 345.00* (7.45) |
| **Tecmar** | *Captain Multifunction Card 0/K* | 109.00* (2.50) |
| ▶ **THI** | ***2MB RAMCard*** *Intel type card w 0K* | 89.00* (2.00) |
| ▶ **THI** | ***Multi 384*** *384K capability 1 Ser 1 Par 1 Game port 1 clock/calendar and 4 software* | 87.00* (1.62) |
| ▶ **THI** | ***Multi I/O*** *I/O Plus Game Ser Par Game clock Numpad* | 89.00* (2.50) |

### PRINTERS

| | | |
|---|---|---|
| **Citizen** | *MSP 10 NEW! 160CPS 80COL Fnc + Trac* | $259.00* (5.59) |
| **Citizen** | *MSP 15 NEW! 160CPS 132COL Fnc + Trac* | 360.00* (7.78) |
| **Citizen** | *MSP 25 NEW! 200CPS 132COL Fnc + Trac* | 455.00* (9.83) |
| **Citizen** | *Premiere 35 NEW! 35CPS Daisywheel 132COL/Fnc + Trac* | 440.00* (9.50) |
| **Citizen** | *120 D 120/25CPS 10" w/Trac* | 189.00* (3.65) |
| ▶ **Epson** | *EX 800 80COL Parallel Matrix* | 410.00* (8.86) |
| ▶ **Epson** | *EX 1000 132COL Parallel Matrix* | 535.00* (11.56) |
| ▶ **Epson** | *FX 85 80COL 160CPS 10" Par* | 345.00* (7.45) |
| ▶ **Epson** | *FX 286E 200CPS NLQ* | 479.00* (10.35) |
| ▶ **Epson** | *LQ 800 80COL 200CPS Parallel* | 445.00* (9.61) |
| ▶ **Epson** | *LQ 1000 136COLS 200CPS NLQ* | 630.00* (13.61) |
| ▶ **Epson** | *LQ 2500 136COLS 132COL Par Set* | 990.00* (21.38) |
| ▶ **Epson** | *LX 86 120CPS 8.5" Friction Feed Parallel w NLQ Switch* | 195.00* (4.21) |
| **NEC** | *2050 20CPS Letter Quality Printer* | 575.00* (12.31) |
| **NEC** | *3550 33CPS Letter Quality Printer* | 690.00* (14.90) |
| **NEC** | *8850 55CPS Printer* | 995.00* (21.49) |
| **NEC** | *Pin Writer P 6 216/180/65CPS 10"* | 615.00* (13.06) |
| **NEC** | *Pin Writer P 7 180/65CPS 132COL* | 585.00* (12.64) |
| **Panasonic** | *1091 i 160/32CPS 10" Par w Trac* | 259.00* (5.60) |
| ▶ **Panasonic** | *KX P1092 180 CPS w Trac* | 304.85* (6.58) |
| **Panasonic** | *KX P1592 180CPS 15" w/Trac* | 410.00* (8.86) |
| **Toshiba** | *NEW! P341E 210CPS/132COL* | 618.00* (13.37) |
| **Toshiba** | *P351 Model II Par/Ser 288CPS/132COL* | 935.00* (20.20) |

### VIDEO CARDS

| | | |
|---|---|---|
| **ATI** | *EGA Wonder* | $250.00* (5.40) |
| **Hercules** | *Color Card w/Parallel Port* | 135.00* (2.91) |
| **Hercules** | *Monochrome Graphics Card* | 165.00* (3.50) |
| **Orchid** | *Turbo EGA Card* | 655.00* (11.34) |
| **Paradise** | *Autoswitch EGA* | 230.00* (7.25) |
| **Quadram** | *Quad EGA + Short Slot* | 295.00* (6.37) |
| ▶ **THI** | ***EGA Plus** w 256K and printer port* | 165.00* (3.56) |
| ▶ **THI** | ***H720** Mono Graphics w Parallel Port 100% IBM and Hercules "Compatible"* | 89.00* (2.00) |
| ▶ **THI** | ***Color Card** 100% IBM "Compatible"* | 89.00* (2.50) |

### ACCESSORIES AND SUPPLIES

| | | |
|---|---|---|
| ▶ **Brand Name DS/DD Diskettes (Box of 10)** | $7.89* | (1.00) |
| *Guaranteed for life. No Germs.* | | |
| ▶ **DS/DD Bulk Pack Special** | ea. .44* | (1.00) |
| *Plus 5¼" PC-Compatible sleeves and labels. Guaranteed 11 Errors.* | | |
| ▶ **PC Network** *Replacement 135 Watt PC Power Supply. Gives your PC, XT or AT the same capacity as an XT. Good for add in tape drives (without hard disk) or other add-ons. Includes* | 79.00* | (2.00) |
| **SMA** *PCDocumate Keyboard Templates for Lotus, DBase, Multimate and others* | ea. 5.99* | (1.50) |
| ▶ **Sony** *10 DS/DD Diskettes (Box of 10)* | 11.00* | (1.50) |
| **WP Printer Paper** *Fanfold sheets. Micro-perf. Unbreakable when burn* | 22.00* | (10.00) |

**†RENT BEFORE YOU BUY**—Members are eligible to join the NETWORK's Business and Game Software Rental Libraries to evaluate products for a full 14 days (Regular Membership) or 30 days (V.I.P. membership) to see if they meet your needs. And the NETWORK'S rental charges are far less than other software rental services—JUST 20% OF THE MEMBER WHOLESALE PRICE. **We feature over 1,000 available titles in IBM, Apple and Mac.**

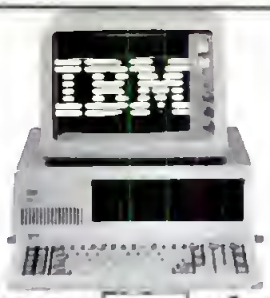
***PC NETWORK Members pay just 8% above the wholesale price, plus shipping.** All prices reflect a 3% cash discount. Minimum shipping $2.50 per order. International orders call for shipping & handling charges. Money orders, personal and company checks please allow 10 working days to clear. All prices subject to change without notice. Products subject to availability.

# COMPUTER PRODUCTS PC NETWORK

## IBM™ XT BASE SYSTEM

IBM™ XT w/256K
Floppy Drive Controller
2 Double Sided Double Density Disk Drives, Mix and Match with your Favorite Monitor and Printer

**$1,075.00***



CALL FOR CUSTOM SYSTEMS

## IBM™ XT HARD DISK SYSTEM

IBM™ XT w/256K
Floppy Drive Controller
1 Double Sided Double Density Disk Drive
Half Height Hard Disk w/20MB

**$1,337.00***

## AT&T PC 6300

640K/2 Floppy/1 Ser/1 Par
Keyboard/DOS

**$1,260.00***

## COMPAQ PORTABLE III

640K, 40MB
Internal Disk Drive/1 Floppy

**$4,095.00***

## COMPAQ DESKPRO

256K CPU/2 Floppy
20MB Hard Disk

**$1,537.00***

## 64K EXPANSION KIT

For the IBM™
Set of 9
150/200ns

**$7.75***

LIFETIME GUARANTEE!

**MEMORY CHIPS**

| | | |
|---|---|---|
| **256K** | *Dynamic RAM/Set of 9* | **$26.10*** |
| **128K** | *For the AT/Set of 9* | **38.10*** |

**MATH CO-PROCESSORS**

| | | |
|---|---|---|
| **Intel 8087** | *5Mhz Co-Processor* | **$105.00*** |
| **Intel 8087** | *8Mhz Co-Processor* | **155.00*** |
| **Intel 80287** | *5Mhz/8Mhz* | **197.00*** |

**MICROSOFT WORD Vers. 3.1**
**$229.00***
**Windows $54.00***

**Lotus METRO**
**$53.25***

## 5.25" DS/DD DISKETTES

Box of 50 **.44* ea.**
Box of 10 **$7.95***

**GUARANTEED FOR LIFE**

**America's Favorite Business Software**

Lotus
**Lotus 1-2-3** Spreadsheet **$285.00***

Ashton-Tate
**DBase III +** Database **$375.00***

Satellite Software
**Word Perfect** Word Processor **$185.00***

Ability™ combines six high-powered PC productivity tools in a single package, yet it is extremely easy to use! Includes Wordprocessing, Spreadsheet, Database, Telecommunications and Presentation Graphics

**$55.00***

MICENT

CIRCLE 525 ON READER SERVICE CARD

**CALL TOLL FREE 8am - 7pm Mon.-Fri. 9am - 5pm Sat. CST**

# (800) 621-SAVE (orders and memberships)

**In Illinois call (312) 280-0002 Validation Code: AB67**

**Customer Service and Order Status (312) 280-1567**

***All Prices in this Ad are Wholesale—Members Pay 8% Over Wholesale Price Plus Shipping.**

## SEE WHY OVER 200,000 HAVE JOINED MAKING US THE NATION'S #1 SOURCE FOR EVERYTHING IN COMPUTING

- ***Our 500 Page Wholesale Catalog***
  *Over 30,000 products priced at Wholesale + 8% Anything you will ever need, at a consistent low price.*
- ***Periodic Catalog Updates***
  *Your Catalog is never obsolete! Keep on top of the newest products and latest price changes*
- ***The Printout***
  *Our newsletter gives you fantastic specials along with unbiased analysis of new products and industry trends*
- ***10 Day Returns on Hardware!!***
  *If you don't like any hardware product — for any reason — return it for a refund*
- ***1000 + Title Rental Library***
  *14 to 30 day rentals on over 1000 different titles Try before you buy!!*
- ***Size, Strength and Stability***
  *The Network has over 200 employees, 55,000 square feet of office and warehouse space, inventory valued in excess of $25,000,000 and is ranked the largest computer product supplier in the nation! Our commitment is to serve our customers and our 90% repeat business rate is proof!!*
- ***OnLine™ Bulletin Board***
  *Download "Freeware" from the nation's largest single concentration of Public Domain software available! Get tied into the nation's largest technical information network! Get tech support or contact customer service from the Network's OnLine,™ not just a bulletin board but a complete customer information network*

## Full Line of LASER PRINTERS

| | | |
|---|---|---|
| ▶ **Citizen** | *Overture 110* | **CALL** |
| ▶ **Hewlett Packard** | *Laserjet* | **$2,150.00*** |
| ▶ **Hewlett Packard** | *Laserjet +* | **2,875.00*** |
| ▶ **Okidata** | *Laserline 6* | **1,425.00*** |
| ▶ **Texas Instruments** | *2015 Omni Laser* | **4,555.00*** |
| ▶ **Texas Instruments** | *2108 Omni Laser* | **4,555.00*** |
| ▶ **Texas Instruments** | *2115 Omni Laser* | **6,076.25*** |

## IMPACT PRINTERS

**See Our Full Line of Epson Printers On the Preceeding Page**

**EPSON FX-286E**

**132COL 200/40CPS NLQ Mode**

**$479.00***

| | | |
|---|---|---|
| **Citizen** | *MSP-10 80COL/60/40CPS* | **$259.00*** |
| **Citizen** | *Premiere 35 35CPS/15" LQ* | **440.00*** |
| **Panasonic** | *1091i 160/32CPS 10" Par w/Trac* | **259.50*** |
| **Panasonic** | *KX-P1092 180CPS/w/Trac* | **304.85*** |
| **Toshiba** | *351 Model II 288CPS/132COL* | **935.00*** |

## Public E-Mail Services: Summary of Features

| | AT&T Mail | EasyLink | MCI Mail |
|---|---|---|---|
| No. of subscribers | info. not available | 140,000 | 140,00 |
| Type of data accepted | Text, binary | Text | Text |
| On-line editing | ● | ● | ● |
| COD delivery | ● | ○ | ○ |
| Receipt notification | ● | ● | ● |
| Priority ranking | ○ | ● | ● |
| Phone notification of message | ○ | ○ | ● |
| Storage of mail received and sent | 24 hours | 3 days | Basic, 24 hours; advanced, 5 days |
| Bulletin board | ○ | ● | ● |
| Databases accessed | None | FYI, Infomaster | Dow Jones News/Retrieval |
| **HARD-COPY SERVICES** | | | |
| U.S. Mail | ● | ○ | ● |
| Overnight | ● | ● | ● |
| Same day | ● | ○ | ○ |
| 4-hour | ○ | ○ | ● |
| 2-hour | ○ | ● | ○ |
| Telex | ● | ● | ● |
| Telegram | ○ | ● | ○ |

PC—Indicates Editor's Choice ●—Yes ○—No

```
Ctrl Home→Menu  Online  0'0[ 30] Print off Buffer: empty          [?  123% free]

Type HELP NEWS for more information.
*****************NOTE*****************
"NEW" Reference Manuals are Available
Send a message to !atthelp
**************************************
Effective 02/25/87 the following access
numbers will be disconnected:
Des Moines  IA. . .(515)-270-0656
Kansas City MO. . .(816)-891-7682
Minneapolis MN. . .(612)-935-7720
**************************************
For Assistance- !atthelp or 1800MAIL672


CREATE a message.
DELETE one or more messages into the WASTEBASKET.
GET a message from the WASTEBASKET.
HELP - display all commands.
PROFILE - display or modify user profile.
QUIT - leave AT&T Mail, emptying the WASTEBASKET.
READ one or more messages.
SHOW what messages are in a folder.
Command: _
```

*AT&T Mail's opening screen gives a variety of system news. Incoming mail will be indicated here. This system has been set on Full menu, which includes commands and short explanations; it can also be set to Brief or Command modes.*

slightly foreign flavor, like somebody reading a language that he doesn't understand.

However, if you are stranded in a hotel somewhere and your laptop computer is misbehaving, it is a great way to check your messages.

**LISTS AND FORMS** Mailing lists are a necessity for any business that really wants to take advantage of its electronic mail service.

MCI Mail makes it easy for you to create a mailing list; you simply type CREATE LIST and enter the desired names and (in the case of paper mail) addresses. AT&T Mail includes mailing lists as part of its Forms/Files option; it works very much like MCI Mail's Create List command. Both MCI and AT&T allow you to combine lists by including the names of other lists and to share lists with other subscribers.

EasyLink offers a RediList mailing-list option that can be set up by contacting Western Union; there is also a Memory Mailing service for high-volume (up to 100,000 addresses), paper-based messages.

Another feature that commercial users find very useful is forms: preformatted messages that contain blank spaces with room for specific information from the readers. MCI Mail features a service called Mail Scripts. Unfortunately, in order to send out a script, you must first create the form as a *dBASE II* program; you can then "publish" your script over MCI Mail. If those who use it are authorized members of your corporation, you pay a fee whenever it is used; or if you put it out for general use, you can specify that the user will be the one to pay.

AT&T Mail's Forms feature in its Forms/Files option is much easier to use. You type CREATE FORM at the command prompt, type in the names of the recipients (or leave that area blank if you haven't decided yet who you want to send it to), and enter the text (a colon indicates a blank space for a response). You can save the form in one of your folders, where it will be available whenever you need it.

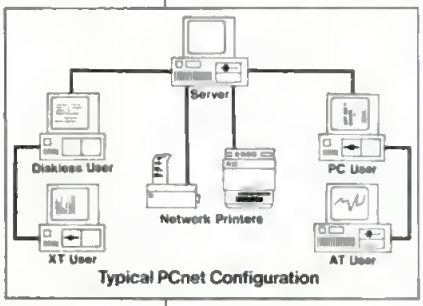
While EasyLink does not have an on-line forms manager, Western Union sells a software product called *Instant Forms*

# ORCHID'S PCnet® MAKES INFORMATION-SHARING CHILD'S PLAY.

## NOW IT'S EASY TO CONNECT YOUR PCs, SHARE FILES AND EQUIPMENT.

Networking used to be more work than it was worth. Until Orchid introduced PCnet®—the *first* local area network for PCs.

Now connecting PCs into networks is exceptionally simple. You just plug in a board, connect a cable and go. This means you and your co-workers get to share common programs as well as equipment. Making your personal and group productivity soar.



Typical PCnet Configuration

### RUN NOVELL NETWARE.™

PCnet doesn't lock you into just one kind of network software. In addition to Orchid's simple, economical PCnet package, we offer the two industry standards:

☐ ***Advanced NetWare.*** Delivers the high performance and security protection of Novell's sophisticated, high-speed networks—without a high price tag. Advanced NetWare is a true file-server system. It allows an easy upgrade from a small group of two to eight users, to a larger network of fifty users or more. Plus, PCnet is easily connected into other networks. With Orchid's PCnet, running Advanced NetWare, your investment is always protected as your business grows.

☐ ***NetBIOS.*** Runs a wealth of programs for the IBM PC Network. It expands the base of software available for PCnet.

### SHARE ONE PRINTER AMONG MANY PCs.

If you have two or more PCs, you need PCnet. Because PCnet makes it practical to share expensive peripherals—such as printers and hard disks—among many users. So that one device can serve the needs of everyone in your office or department. And you save by splitting costs.

### LOOK AT OUR TRACK RECORD.

Since 1982, PCnet has established an unparalleled record for quality and value—making it the leading network solution for small businesses and corporate departments. That's because it's both proven reliable, *and* easy to install and operate.

So for the best value in networks, get PCnet. Call **(415) 683-0300** today. Or call your local dealer.

**PCnet®**

ORCHID TECHNOLOGY
45365 NORTHPORT LOOP WEST
FREMONT, CA 94538
(415) 683-0300, TLX 709289

ORCHID (EUROPE) LTD.
UNIT 9A, INTEC-2,
WADE ROAD
BASINGSTOKE, HANTS,
RG24 0NE
GREAT BRITAIN
TEL 0256 479898
TLX 946240
REF 19023380

ORCHID

PCnet is a registered trademark of Orchid Technology. Advanced NetWare is a trademark of Novell, Inc. All other product names are trademarks of their manufacturers.

CIRCLE 492 ON READER SERVICE CARD

*Plus* to help customers generate a variety of forms over its electronic mail service.

**DATABASE ACCESS** To sweeten the pot, both MCI Mail and EasyLink provide direct access to database services.

MCI Mail has associated itself with the extensive information facilities provided by the Dow Jones News/Retrieval service. You can have immediate access to the database by simply typing DOWJONES at a prompt, and you will be billed by Dow Jones at its usual rates.

EasyLink users can gain access to two useful sources of information: Western Union's own FYI news service, and its expansive InfoMaster facility. FYI is a comprehensive database that contains a variety

## PC MAGAZINE FACT FILE

**AT&T Mail**
AT&T Customer Assistance Center
P.O. Box 3505
New Brunswick, NJ 08903
(800) 367-7225, ext. 720

**Basic E-Mail Charges**
- Service fee, $2/month (starts after 3 months on service). Note (400 characters or less), $.40; message (401 to 7,500 characters), $.80; COD (7,500 characters or less, charged to recipient), $1.25; each additional message unit (per 7,500 characters or less), $.80.

**Other E-Mail Charges**
- Access via WATS line, $.15/minute.
- Forms/Files option (allows permanent storage of an average of 30 storage units/day), $10/month. Additional storage units, $.30 each/month.
- Message creation: off-line, no charge. On-line fees: Note, $.20; message, $.45; return receipt, $.40; shared address lists (per 7,500 characters or less), $2/month.
- AT&T Mail Talk (voice message retrieval), $.45/minute.
- Volume discounts available.

**Hard-Copy Mail Charges**
- U.S. Mail delivery, $2; overnight delivery, $7.50; same-day delivery, $27.50.
- Telex messages: domestic per each telex minute, $.70; international prices vary according to destination country.

**Other Charges**
- Logo/signature registration, $12 each/year.
- Off-Net User Directory listing, $12/year.

CIRCLE 664 ON READER SERVICE CARD

**Software**
***AT&T Mail Access I and II***
AT&T Customer Assistance Center
P.O. Box 3505
New Brunswick, NJ 08903
(800) MAIL672

**List Price:** *AT&T Mail Access I*, $85; *AT&T Mail Access II*, which offers access to other e-mail services, $140; volume discounts are available.

**Requires:** 256K RAM, modem, DOS 2.0 or later. Not copy protected, but software will not receive messages from AT&T Mail users using software with the same serial number.

CIRCLE 663 ON READER SERVICE CARD

**EasyLink**
Western Union Telegraph Co.
One Lake St.
Upper Saddle River, NJ 07458
(800) 435-7375

**Basic E-Mail Charges**
- All e-mail rates are priced by the minute and billed in 6-second increments.
- Via local access: 300 bps, $.35; 1,200/110 bps, $.50.
- Via WATS line: 300 bps, $.65; 1,200/110 bps, $.80.
- Via telex, $.50.
- Messages sent to a single address, $.20 each; messages sent to two or more addresses, $.10 per address.

**Other E-Mail Charges**
- For WATS line users: a $.30 flat fee is charged for each connection.
- Mailbox retrieval and mailbox hold retrieval, $.30/minute billed in 6-second increments; mailbox scan and mailbox hold scan, $.30/minute billed in 6-second increments.

**Hard-Copy Mail Charges**
- Telex messages are priced by the minute and billed in 6-second increments. Worldwide telex messages are billed in 1-minute increments. Cablegrams and telegrams are priced by the word. Mailgram messages and computer letters are priced by the page.
- Computer letter/priority letter: first page, $1.50; each succeeding page, $.50. Western Union telex: via local access, $.55; via WATS line, $.85; via telex, $.55. Alaska and other U.S. telex carriers: via local access, $.70; via WATS line, $1; via telex, $.70.
- International prices vary according to destination country. Mailgrams: first electronic page, $3.95; each succeeding half-page (1,250 characters), $.50; mailgrams to Canada, $1.15 surcharge. Telegrams, $.05/word (six characters/word) plus $2.75 service charge. Cablegram prices vary according to destination country.

**Other Charges**
- Mailed copy of mailbox message, $.50/message after 10 days' storage.
- Notification of delivery for EasyLink and telex messages, $.25 each.
- Priority delivery, 20 percent surcharge.
- Volume and off-peak discounts available.

**Information Charges**
- Directory Information Service, $10/year.
- FYI News Service. Via local access: 300 bps, $.45/minute; 1,200/110 bps, $.60/minute. Via WATS line: 300 bps, $.65/minute; 1,200/110 bps, $.90/minute.
- Official Airline Guide. Via local access: 300 bps, $.90/minute; 1,200/110 bps, $1.20/minute. Via WATS line: 300 bps, $1.10/minute; 1,200/110 bps, $1.40/minute.
- InfoMaster (connect time charges per minute): Via local access, $.15; Via WATS line, $.35; basic search fee, $8 (waived if no items are found).
- For full-text items, first 15 headings plus full text of one item are included in basic fee; additional full text item and additional sets of up to 15 headings (including the full text of one item), $6 each.
- For bibliographic databases, first ten titles are included in basic fee; additional sets of one to ten titles; $6/set; abstracts; $2 each.
- Photocopies of found items: regular mail, $15; express delivery, $35. Approximately 50 databases impose a $6 surcharge; several impose a $25 surcharge.

CIRCLE 662 ON READER SERVICE CARD

**Software**
***Instant Mail Manager***
***Instant Mail Manager XPC***
***Instant Forms Plus***
Western Union Telegraph Co.
13022 Hollenberg Dr.
Bridgeton, MO 63044-2490
(800) 247-1373, Dept. 285

**List Price:** *Instant Mail Manager*, $150; *Instant Mail Manager XPC*, $185; *Instant Forms Plus*, $100 (with *Instant Mail Manager*, $225; with *Instant Mail Manager XPC*, $255).

**Requires:** *Instant Mail Manager* and *Instant Forms Plus*: 256K RAM, modem, DOS 2.0 or later. *Instant Mail Manager XPC*: 384K RAM, modem, DOS 2.0 or later. Not copy protected.

CIRCLE 661 ON READER SERVICE CARD

of topics such as UPI bulletins; Japan's Kyodo English news service; various business, finance, and news bulletins; several entertainment features; and access to the Official Airline Guide. A major advantage for EasyLink subscribers is that they can arrange to have updated news or figures from FYI delivered directly to their EasyLink mailboxes on a regular basis.

EasyLink users can also arrange to use the InfoMaster database service (reviewed in *PC Magazine*, Volume 5 Number 20), which provides access to over 800 independent on-line databases. As of this date, plans were being made to allow InfoMaster subscribers to take advantage of the same automatic retrieval service that is available with FYI; this feature is due to go into effect this month.

As is the case with many types of software, the electronic mail service you choose depends mostly on your company's needs or your individual needs.

If you simply want to be able to contact as many people as possible as quickly and easily as possible, then MCI Mail is still the most obvious choice. Not only does it offer a great variety of e-mail options, but its recent linkup with CompuServe, allowing users of both services to contact each other across the two systems, gives it a strong advantage. MCI Mail also recently completed a connection with France's Missive system, providing its subscribers with international access.

EasyLink has also completed interconnection arrangements with Japan, France, and the United Kingdom, and boasts an equally large user base. Other advantages to using EasyLink include a variety of hard-copy services and access to Western Union's excellent InfoMaster database system. In addition, the pace of running EasyLink has improved considerably since I last reviewed it (*PC Magazine*, Volume 4 Number 18). Western Union has succeeded in eliminating the pauses between prompts that were so irritating, and the system now runs at about the same pace as MCI Mail or AT&T Mail.

However, as an electronic mail service, EasyLink is so awkward to use that many hard-core e-mail users will be too frustrated to use it to full advantage.

Finally, corporations interested in using a public e-mail service for primarily intracorporate communications may want to take a good hard look at AT&T Mail. While MCI Mail provides excellent services through its Advanced service, AT&T Mail's Forms/Files option with its unlimited data storage could offer considerable advantages to companies whose needs lie in that area.

It would, of course, be ideal if all three services would get together and allow their users to contact each other through a general linkup, much as a subscriber to US Sprint's long-distance phone service can call an AT&T subscriber and vice versa. But then the only factors separating the three systems would be cost and available features—and perhaps they aren't ready to put themselves to that kind of test. PC

*Barbara Krasnoff is a frequent contributor to* PC Magazine *who has written extensively on electronic mail.*

**Both MCI Mail and EasyLink provide direct access to database services.**

**MCI Mail** EDITOR'S CHOICE
MCI
P.O. Box 1001
1900 M St. NW
Washington, DC 20036
(800) MCI-2255

**Basic E-Mail Charges**

- Mailbox fee, $18/year. Messages up to 500 characters, $.45; 501 to 7,500 characters, $1; each additional 7,500 characters, $1. TYMNET access, $.05/minute; WATS line access, $.15/minute.

**Other E-Mail Charges**

- Advanced service, $10/month Discounts available for the same message to many addresses with one Send (applies only to MCI letters and overnight letters within the United States).

**Hard-Copy Mail Charges**

- MCI letter up to three pages: domestic, $2; international, $5.50.
- Overnight letter up to six pages: domestic, $8; international, $12 to 30. Four-Hour letter up to six pages: domestic, $30; each additional three pages; $1.

**Other Charges**

- Logo/signature registration, $20/year (for both if registered at the same time; per graphic otherwise).
- MCI Mail Alert, $1; return receipt, $.25. MCI Mail Scripts: up to ten scripts, $25/month; each additional script, $2.50; maintenance fee, $.25/minute. Scripts abort fee, $1. Shared lists: up to 10 lists, $25/month; each additional list, $2.50.

**Information Charges**

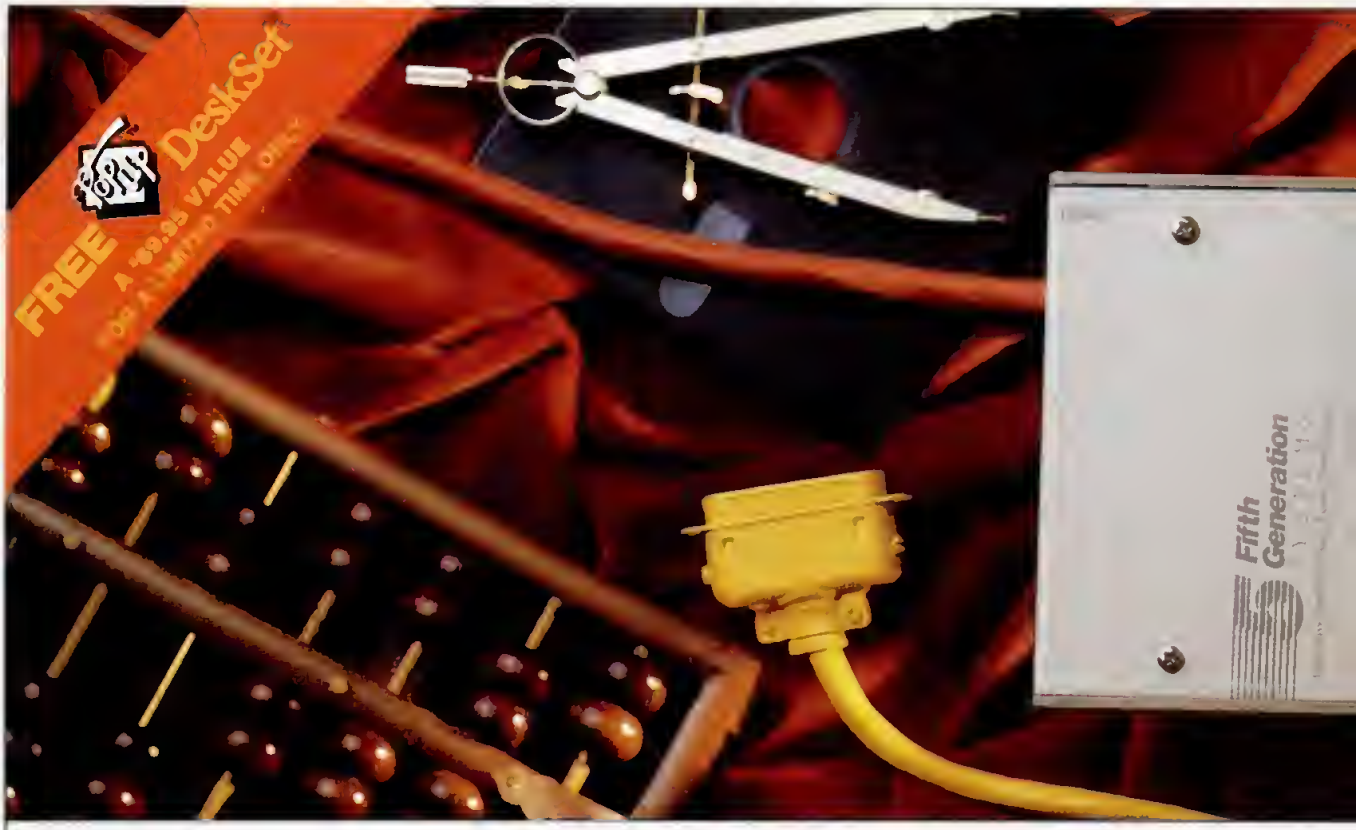
- Bulletin Board users, $.30/minute. Bulletin Board owners: up to ten boards, $25; each additional board, $2.50; $.30/minute maintenance fee. Bulletin Board posting: $.25/1,000 characters Bulletin Board storage: $.01/day per 1,000 characters; no charge for first 5 days.
- Dow Jones News/Retrieval, standard rates apply.

CIRCLE 660 ON READER SERVICE CARD

**PC MAGAZINE EDITOR'S CHOICE**

- **MCI Mail**

*If you are looking for a good, solid public electronic mail system that both is easy to use and gives access to large numbers of users, then MCI Mail comes out ahead. Although EasyLink does have slightly more subscribers and also provides access to excellent informational facilities, it still lacks the on-line amenities that MCI users take for granted. AT&T Mail's options are clearly superior to many of those provided by both of its competitors, but its late entry into the e-mail market means it will probably be more useful for intracorporate communications.*




# Your logical choice for

**It's your choice.**

Now you can give every PC user in your office *freedom of choice:* the choice to send their output to any printer — serial or parallel — anytime.

And you *don't* need a collection of printer switches, print buffers, parallel-serial converters, cables and adapters to do it.

All you need is *The Logical Connection** Version 3.0.

**Instant switching.**

Version 3.0's new *memory resident "Pop-Up"** software lets *any* computer send its output to *any* printer, plotter, modem or other peripheral, *any* time . . . even in mid-application!

Just "pop-up" the switching menu, cursor-point to the device you want to switch to, and press *ENTER*.

If two or more computers send documents to a printer at the same time, *The Logical Connection** spools the documents in its big buffer (256K or 512K, depending on model purchased), then prints them out in sequence.

**Automatic configuration.**

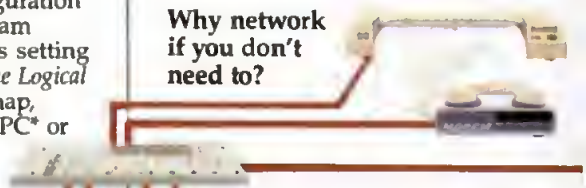
The brand new *LCSETUP* configuration program makes setting up *The Logical Connection** a snap, using any IBM-PC* or compatible computer.

Just cursor-point to a graphic "picture" of the configuration you want and download it with a couple of keystrokes. Then plug in your computers & peripherals, and you're ready to go!

*Preset configurations* are supplied for most applications, giving multiple computers unlimited "switch and share" access to printers, plotters and modems — and each other.

If you need a *custom* configuration, you can easily modify one of the *presets* — or create your own — with Version 3.0's simplified configuration software.

**Why network if you don't need to?**



Local Area Networks (LANs) can be confusing, cumbersome, and *costly.* For peripheral sharing applications, *The Logical Connection** can outperform a LAN, right out of the box — at a far lower cost.

And for many *data sharing*

# the Logical Connection

A Peripheral Sharing Device

# printer & data sharing.

**Get Pop-Up* DeskSet* FREE!**

For a limited time, you get the highly acclaimed Pop-Up* DeskSet* desktop organizer FREE with your purchase of The Logical Connection.*

These memory resident tools "pop-up" anytime you need them, and include a deluxe Text Editor, Appointment Scheduler, Address Book, Financial Calculator, Alarm Clock, multi-tasking DOS functions and much more.

*PC Magazine* named DeskSet* "Editor's Choice" among all desktop organizers reviewed. A $69.95 value, it's yours FREE if you act quickly.

applications, a simple communications program is the only software you'll need. *The Logical Connection** lets minicomputers and mainframes share peripherals (or data) with PC's. For really *big* applications, you can "daisy-chain" up to 45 *Logical Connection** boxes together, up to 3/4 of a mile apart.

Or, connect a pair of *Logical Connections** to a pair of inexpensive modems and let all the computers and printers at one location "talk" to all the devices at another location — over a single telephone line!

The possibilities are limitless.

**An easy choice.**

*The Logical Connection** is easy to set up and easy to use. Best of all, it's easy on the pocketbook.

For price, performance and ease of use, nothing else even comes close.

So if you're looking for the *best* way to share your valuable computers and peripherals, there's only *one* logical choice: get *The Logicol Connection** today.

For the name of your nearest dealer, call *Fifth Generation Systems* at **1-714-553-0111.**

**$495**

Suggested retail price (256K Model)

**Fifth Generation**

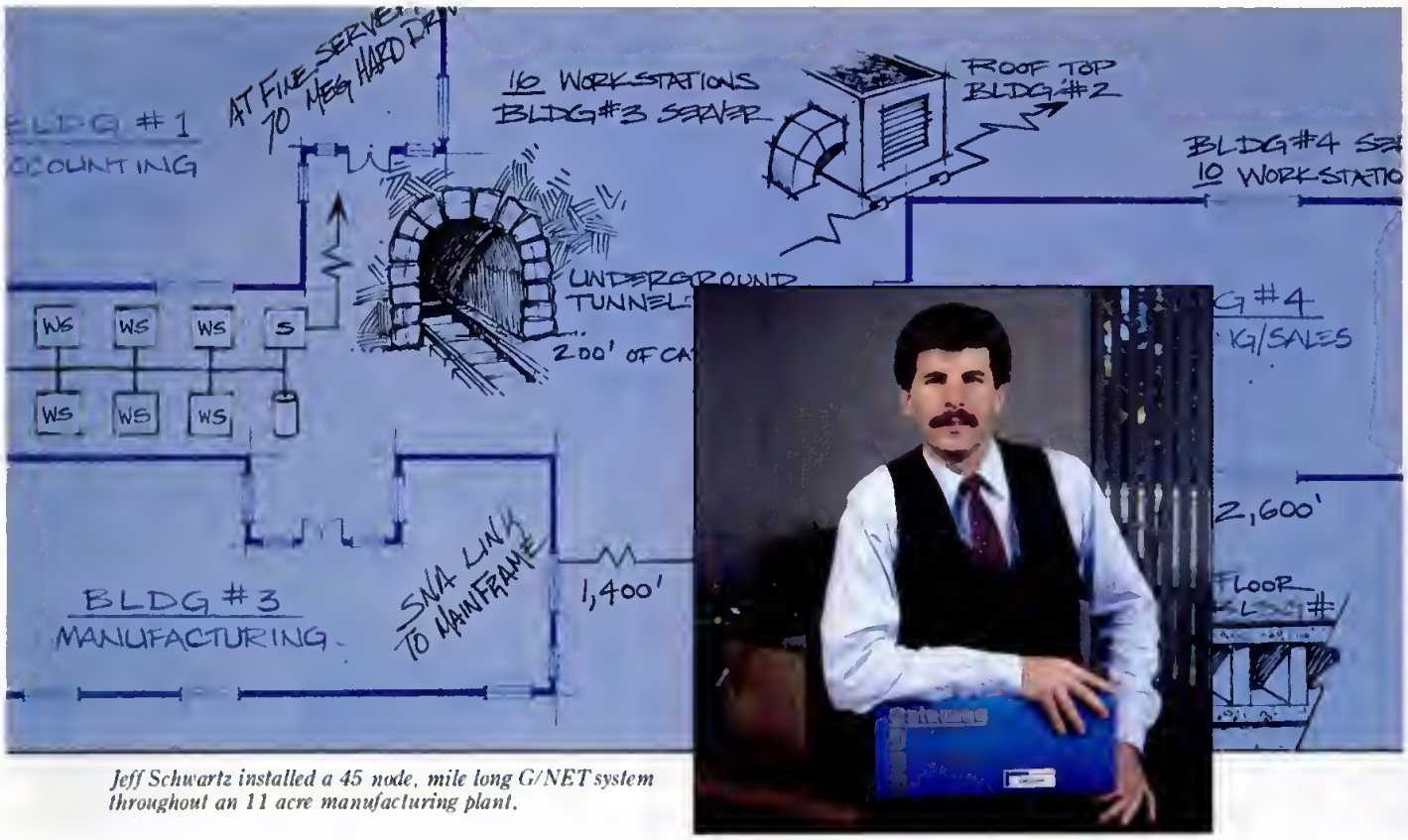
S Y S T E M S

Innovative Products Using Today's Technology

11200 Industriplex Blvd., Baton Rouge, LA 70809
**SALES AND MARKETING:**
2691 Richter Ave., Suite 107, Irvine, CA 92714
(714) 553-0111

*The Logical Connection is a trademark of Fifth Generation Systems, Inc • Pop-Up and DeskSet are trademarks of Popular Programs Inc • IBM-PC is a trademark of International Business Machines Inc

CIRCLE 287 ON READER SERVICE CARD




*Jeff Schwartz installed a 45 node, mile long G/NET system throughout an 11 acre manufacturing plant.*

# "I bought their old LAN and replaced it with G/NET™."

Says Jeff Schwartz, President of InterConnect Data Systems, a networking and communications VAR. "We were asked by a major manufacturing company to upgrade an existing LAN in their local plant.

### Desperate Users

"They were having reliability problems with their network. At 10 nodes, network throughput was declining and users were losing data. In desperation, some were even disconnecting themselves from the LAN and going back to using floppies with their standalone PCs.

"We worked up a comprehensive plan to solve their problem, and recommended G/NET. However, they were reluctant to lose their investment in their old LAN, so we offered to buy back their entire network if they would follow our recommendation.

### G/NET Designed to Maintain High Throughput

"We knew G/NET is designed to handle network problems like this. It has a special coprocessor built in to increase actual throughput, and maintain that throughput as you add more workstations. The coprocessor offloads the network management from the PC, thus freeing up the PC to do what it was designed to do... run applications.

"This coprocessor feature allowed us to add network workstations and string cable over longer distances, while still protecting the integrity of the data.

### 45 Nodes, Over a Mile of Cable

"They accepted our offer, and almost a year later their G/NET LAN has grown to 45 workstations in three buildings, with over a mile of cable traveling underground, between floors, and over rooftops.

"They even bought another G/NET system for their national office. And with Gateway Communications' SNA and bridging, we can connect both G/NET LANs together, while providing SNA gateways to their mainframe.

"We had never made an offer to buy back a system before. It was risky for a small company like ours, but the gamble paid off.

"Thanks Gateway."

Jeff Schwartz
President, InterConnect Data Systems, Inc.

For more information on how you can get G/NET, with SNA, X.25, and asynchronous communication options, call:

## (800) 367-6555

(714) 553-1555 in California

**Gateway communications, inc.**
Your PC SafetyNet.™

2941 Alton Ave. Irvine, CA 92714

G/NET and PC SafetyNet are trademarks of Gateway Communications Inc

CIRCLE 324 ON READER SERVICE CARD

# *Corporate E-Mail:* THE ELECTRONIC MAILROOM

*Electronic mail services designed exclusively for the intracorporate arena are valuable business tools. Their special features can make them useful alternatives to the better-known public services.*

Many PC users once thought that a universal electronic mail service, connecting every microcomputer through a central system, was the wave of the future. However, recent events seem to indicate otherwise. While services that welcome individual subscribers, such as EasyLink and MCI Mail, are certainly holding their own, the true representatives of the communications revolution seem to be the mail systems that provide large, multisite companies with intracorporate e-mail.

These services provide their clients with a number of advantages. They allow the quick and convenient exchange of information between PCs (or even dumb terminals) without the need for network setups or other elaborate hardware. They offer a level of security that may not be provided by the more-generalized e-mail services. And most provide both a high degree of support and the ability to specialize to fit the needs of the consumers.

Although the electronic communications services described in this article certainly contain unique features, they have much in common. All allow the exchange of text through either the uploading of files or direct on-line entry. In addition, they all have some kind of security to regulate the flow of information; are on-line 24 hours a day, 7 days a week; have access to telex services; and provide various types of end-user support. Many of these services stress their access to international communications, which can be important to corporations that require quick contact with their overseas offices.

The following are short overviews of the six major corporate electronic mail systems now available in the United States. Of course, these aren't the only such options available to corporations: the three

public services covered elsewhere in this issue, MCI Mail, EasyLink, and AT&T Mail, offer strong business support, and many of the more-generalized systems, such as Delphi, also offer electronic mail. But the services reviewed here are tailored to the corporate environment, and for some companies, they may represent a better solution to e-mail than the public providers.

## Mail

Dialcom's Mail electronic mail system was introduced in 1980, 10 years after the company was established (and 6 years before it became a wholly owned subsidiary of British Telecom).

Dialcom aims its e-mail services at corporations with three or more branch locations or subsidiaries, and mail is primarily used for intracompany business sending and receiving messages.

Mail is only one segment of Dialcom's e-mail services, which are broken down into specialized segments in a system Dialcom calls Value Added Services. A feature called FT is available for binary file transfer. Batch file transfer is handled by a function called PC Mail; and XMail handles hard-copy messaging such as telex, cablegrams, and mailgrams.

PC MAGAZINE FACT FILE

**Mail**
Dialcom Inc.
6120 Executive Blvd.
Rockville, MD 20852
(301) 881-9020
CIRCLE 659 ON READER SERVICE CARD

Dialcom also recently introduced a software product called *UpFront*: a front-end package for the PC that handles both Mail and XMail functions and that includes a text editor, a microlanguage, a tutorial mode, a forms processor, automatic sign-on, and an address book.

Other Value Added Services provided by Dialcom include electronic forms creation, electronic publishing, bulletin boards, a multilevel spelling checker, access to electronic news-wires and news services, and a news clipping service. The clipping service is an interesting feature that will do a search on preselected phrases and automatically place the found articles in the user's mailbox. Dialcom also offers a gateway to any database accessible by public network and communications with overseas networks; in the fourth quarter of 1987, subscribers will be able to hook-up to overseas x.400 protocol software using a new user interface.

New Dialcom customers are visited by a company representative who appoints a system manager to administer the system.

> Dialcom's Mail is a command-based system, but specialized menus can be arranged for each company.

At that point, several of Mail's services are also set up, such as a cross-referenced directory, which can contain nicknames or other personal references, and distribution lists. System managers are also responsible for account security and menu control (the ability to restrict various features to appropriate personnel). If employees need further help, technical assistance is available through a toll-free number during business hours, and there is a 24-hour emergency hot-line.

Mail is a command-based system, but specialized menus can be arranged for each company. Incoming and outgoing messages are not deleted, except by the user, and can be filed on an indeterminate basis for a storage fee. (Mail is automatically filed by the system after 30 days; at the time of this writing, there was the probability that the number of days that mail could remain outside of storage would change.)

Messages can be password protected, sent with reply and acknowledgment requests, sent as courtesy and blind copies, listed as priority, and sent on a deferred basis by date and/or time. Users can create forms on-line and can also access corporate-form libraries.

Large corporations that want to handle their own e-mail systems in-house have the option of buying the Mail software. Dialcom currently administers about 180,000 mailboxes on its own system worldwide.

## Notice

Computer Sciences Corp.'s first electronic mail service was a rudimentary in-house system called Field Data. That system eventually evolved into Notice, which is now available to corporations that need to exchange both text and binary files.

Notice emphasizes strong user support. Once a company has subscribed to the service, customer-support personnel go on-site to train the designated system administrator. The administrator has control of assigning passwords, adding and deleting users, changing names, and other similar functions.

"We have in-country support from local support representatives in almost all major cities in the world," said a Notice spokesman. "When customers have an office in, say, Singapore or Hong Kong or Tokyo, they have someone they can call on to deal with the local communications authority, to assist them in getting modems, and to help them install."

Users outside the central installation site are provided with a front-end communications software product called *Notice PC II*. However, subscribers can access Notice using any major communications package; in fact, CSC can supply standard or modified script files for use with pro-

PC MAGAZINE FACT FILE

**Notice**
Computer Sciences Corp.
Infonet Division
2100 E. Grand Ave.
El Segundo, CA 90245
(213) 615-0311
CIRCLE 658 ON READER SERVICE CARD

## Corporate E-Mail Services: Summary of Charges

| Product<br>Company | Minimum | Connect time | Per character | Storage | Miscellaneous | Special rates |
|---|---|---|---|---|---|---|
| **Mail**<br>Dialcom Inc. | None | Standard, $1–$6/hour; prime, $1–$7/hour | $.05/1,000 characters | $.25–$.50/2,048 characters | If using another network when transferring or receiving, $4–$7/hour; if using private line, $1/hour | With 1-year commitment, $1,260 for over 150 hours, discounts available |
| **Notice**<br>Computer Sciences Corp. | $500/month | In U.S., $15/hour; overseas, $40/hour | In U.S., $.15/1,000 characters; overseas, $.40/1,000 characters | $.01/1,000 characters | None | None |
| **OnTyme**<br>McDonnell Douglas Information Systems Group | One-time fee, $500; 2-minute minimum/session | $3/hour; in Hawaii, Puerto Rico, and New Mexico, $8/hour | $.25/1,000 characters | $.01/1,000 characters | For record of account on tape, $100, for record in printed form, $250 | Annual usage discounts $5,000–$10,000, 10 percent; $10,001–$30,000, 20 percent, over $30,000, 30 percent |
| **The Quik-Comm System**<br>General Electric Information Services Co. | $.10/session | None | $.35/1–300 characters, $ 70/301–1,500 characters, $1/1,501–3,000 characters | No charge | None | None |
| **RCA Mail**<br>RCA Global Communications Inc. | $500/subscribing organization | Standard, $4/hour; prime, $14/hour | None | $.007/1,000 characters after 5 days | None | None |
| **Telemail**<br>GTE Telenet Communications Corp. | None | Standard, $7/hour; prime, $14/hour | $.05/1,000 characters | $.007/1,000 characters after 5 days | None | Corporate: $500 minimum per company allows unlimited mailboxes. Small business: no $500 minimum, $20 per mailbox |

grams such as *Crosstalk* and *Relay*.

Each user is also given a user ID, password, mailbox name, and, if desired, verified project codes. The passwords are associated with the user (or location) ID and can be changed by the administrator; mailbox names can be changed by their individual owners. If further levels of security are required, administrators can set up an "auto log" file that executes each time a user signs on to a specific ID and that can be programmed to ask for whatever security clearances the programmer sees fit.

Notice is a command-based system without a menu mode. It contains unlimited storage capabilities; however, the process is not automatic, and users must save their messages in files. For example, incoming messages are automatically deleted after they are read unless the receiver specifies otherwise. Messages can be prioritized, date and time stamped, encrypted or protected with additional passwords, and forwarded. Programs that aid in message control, which CSC calls "processes," can be set up within the system; for example, if five branch offices must send in a weekly report, the process would wait until all five reports are in, consolidate them, and send the consolidated report to headquarters.

Notice contains address-search facilities, form creation, and address listing capabilities. There is also access to telex, and CSC plans to institute hard-copy U.S. mail delivery in the second quarter of 1987. The pricing system is based upon a charge per character count and a charge for connect time.

## OnTyme

OnTyme has a varied history. It was originally released by Tymnet in 1980 when that company was a part of Tymshare. About 3 years ago, Tymnet and Tymshare were acquired by McDonnell Douglas, and OnTyme came along with them. It is currently administered by Applied Communications Systems, part of the McDonnell Douglas Information Systems Group.

OnTyme itself, the electronic mail system, currently boasts approximately 500 accounts (around 500,000 mailboxes); it is actually part of a spectrum of messaging services called OnTyme Plus. A related product, FileXchange, applies the concept of electronic messaging to the movement of files (both digital and text) between per-

### FACT FILE

**OnTyme**
McDonnell Douglas Information Systems Group
20705 Valley Green Dr.
Cupertino, CA 95014
(800) 435-8880
CIRCLE 057 ON READER SERVICE CARD

sonal computers. OrderXchange applies that same concept to remote order entry, using what an ACS representative termed "cooperative processing" between the user's PC and Tymnet's mainframes. Finally, EDI (electronic data interchange), considered OnTyme Plus's high-end product, enables the mainframes of several different corporations to communicate with each other.

OnTyme Plus is marketed to Fortune 1000–size companies, but customized applications are also sold to smaller operations.

OnTyme Plus is marketed to Fortune 1000–size companies, but customized applications are also sold to smaller operations. Pricing is based on resources consumed; for example, OnTyme charges on a per-kilocharacter basis for sending and receiving, and there is a connect-time charge.

Customers are encouraged to assign control of their service to an in-house accounts supervisor, who has special license over user authorization. These administrators are trained on-site by field consultants; McDonnell Douglas also provides technical support through an 800 number that operates from 6 A.M. to 6 P.M. Pacific Standard Time.

OnTyme is a command-based system; however, a corporation can set up an automatic menu system that allows access to whatever specialized options the corporation needs. Users can exchange both text and binary data (the latter through the Xmodem protocol). Incoming and outgoing messages are stored automatically by the system for 14 days from the time they were sent; there are also private storage areas available for each user's messages.

Public files containing user directories, address lists, and other information can be set up by the supervisor. There is an automatic return receipt feature built right into the system, which gives users the status of messages they have sent. OnTyme users have access to telex services, but no other hard-copy messages are available. The service also features its own Exec language that allows users to build programs for use with OnTyme, including on-line forms.

Although OnTyme has no database services of its own, users can also build Exec procedures that automatically connect, log in, and collect information through OnTyme. Subscribers also have access to Tymnet's vast range of international connections, providing direct links to about 60 cities around the world. In addition, a feature called Inter-OnTyme allows messages to be sent between two consenting corporations.

## The Quik-Comm System

The Quik-Comm System is a closed electronic mailbox service that resides on General Electric Information Services Co.'s Mark III computer service. It is accessed from around the world using GE's teleprocessing network.

As with many e-mail systems, Quik-Comm began in the mid-1970s as an in-house service and was first offered commercially in 1981.

Instead of charging for terminal-connect hours in kilocharacters and computer resource units, GE charges for the service using a simpler system based on the size of the message transmitted.

GE focuses on large companies in a multinational environment, although those are not its only clients; at present it has approximately 5,000 subscribers. According to company representatives, the network can be accessed through a local phone call from over 750 cities in 30 countries around the world. In addition to English, Quik-Comm's command language can accommodate French, German, Spanish, Italian, Swedish, Finnish, Danish, and Dutch.

GE also emphasizes a high level of security throughout the system. It utilizes closed systems that are run by in-house administrators, who can set security level and passwords. (Recently, GE announced a capability called Cross Community that allows users from different corporations to exchange e-mail.) There is also end-user encryption capability.

Quik-Comm works strictly on a command-based structure and accepts both text and binary data. Incoming and outgoing messages are stored for the length of time determined by the company's administrator or can be stored in separate user files. Bulletin boards, user searches, and address lists are all available, and both senders and recipients can check the status of their messages at any time. Users with problems can call a 24-hour 800-number hot-line service; GE also sells a communications software package called *PC Mailbox*, which includes a text processor and forms generator. Quik-Comm gives its subscribers access both to telex and to its Quik-Gram service, which sends hard-copy mail through the U.S. Postal Service. Subscribers can also request use of GE's database access service, called GEnie, or request access to various mainframe systems. (The number of add-ons, such as GEnie and bulletin boards, depends on specific arrangements made with GE.)

PC MAGAZINE FACT FILE

**The Quik-Comm System**
General Electric Information Services Co.
401 N. Washington St.
Rockville, MD 20850
(301) 340-4000
CIRCLE 656 ON READER SERVICE CARD

## RCA Mail

RCA Mail, from RCA Global Communications, is a full-service electronic mail system that aims its services at multisite companies with a minimum of 50 to 100 locations.

Its emphasis is on customizing its services based on the customer's application needs. RCA representatives set up demonstration models for new subscribers to

# We put our money where our Mouse is.

# LOGITECH C7 MOUSE $99

PC MAGAZINE "EDITORS CHOICE"

*"...To sum up my feelings about this mouse and menu generating system: this is the one I want."* *Phil Wiswell*
*PC Magazine, Jan 27, 1987*

At LOGITECH we've spent years perfecting our high-quality mouse hardware and software. And every LOGITECH Mouse reflects the engineering we've devoted to it.

**MAXIMUM COMPATIBILITY**
The programmable LOGITECH Mouse works with virtually ALL hardware and application software.

**BEST MOUSE TECHNOLOGY**
The opto-mechanical LOGITECH Mouse offers the best of all worlds. Mechanical tracking (a ball) and optical decoding (precise, reliable optical encoders). Every major computer manufacturer, including Apple, IBM and DEC, has chosen opto-mechanical mouse technology. LOGITECH offers the only opto-mechanical mouse on the retail market.

**BEST MOUSE FOR GRAPHICS & CAD**
High (200 dot per inch) resolution, precise tracking, and a 3-button design are essential for graphics and CAD.

**BEST MOUSE FOR DESKTOP PUBLISHING**
Ergonomic styling is a must for all mouse-intensive desktop publishing applications. High resolution is essential for high-resolution screens.

**BEST MOUSE FOR SPREADSHEETS & WORD PROCESSING**
The smooth-tracking LOGITECH mouse is a productivity tool for all types of data entry and editing. We've even created a special mouse interface for 1-2-3 which makes 1-2-3 users up to 30% more productive!

**BEST MOUSE SOFTWARE**

*"Logitech's Plus Package adds an excellent menu builder (with useful examples), a fast windowing text editor, and an outstanding Lotus 1-2-3 interface."* *Ezra Shapiro*
*Byte*

Our Plus Software also includes our Microsoft-compatible drivers, and CLICK which sets the mouse automatically for any application.

**BEST DEALS**
We offer either our C7 or Bus mouse, with Plus software, packaged with some of the most exciting applications on the market, at very exciting prices.

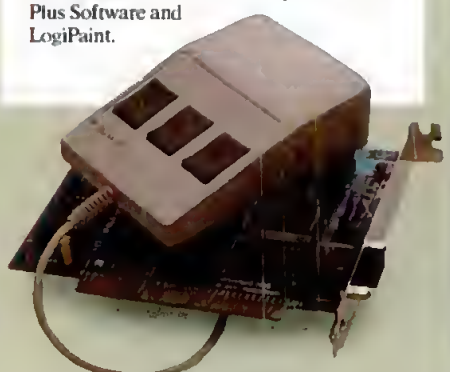
**LOGIPAINT** **Special Offer! $149**
The LOGITECH Mouse with PC Paintbrush is the most advanced paint set available for the PC. It offers 11 type fonts, a pallet of 16 colors, and the ability to import and embellish files from other applications.

**LOGICADD** **$189**
The LOGITECH Mouse packaged with Generic CADD and Dot Plot turns your PC into a complete CADD workstation. Generic CADD offers the features and performance of high priced CADD at an unbelievably low price. DotPlot is the add on utility that enables you to produce crisp, high resolution drawings from your dot matrix printer.

**LOGIPAINT-&-DRAW** **$219**
The LOGITECH Mouse packaged with LOGIPAINT and LOGICADD. Together they are the complete graphics toolkit for combining freehand and technical drawings.

NEW

**LOGITECH BUS MOUSE**
**$149 with LogiPaint**
100% Microsoft Bus Mouse Compatible!
It has all the features of the LOGITECH C7 MOUSE, plus it leaves the serial port on your computer free for other peripherals. It comes standard with our-top-of-the-line Plus Software and LogiPaint.



Lotus and 1-2-3 are trademarks of Lotus Development Corp. Generic CADD is a trademark of Generic Software Inc. PC Paintbrush is a registered trademark of ZSoft Corp.

**YES!** I want the opto-mechanical LOGITECH Mouse!

- ☐ LOGITECH C7 Mouse w/Drivers **$99**
- ☐ LOGITECH C7 Mouse w/Plus Software **$119**
- ☐ LOGITECH BUS Mouse w/Plus Software and LogiPaint **$149**

Additional Software
(with C7 and Plus or Bus Mouse and Plus.)

- ☐ LOGIPAINT **$149**
- ☐ LOGICADD **$189**
- ☐ LOGIPAINT-&-DRAW **$219**

Add $6.50 for shipping and handling. Calif. residents add applicable sales tax. Prices valid in U.S. only.

Total Enclosed $_____

30-Day Money-Back Guarantee/3-Year Warranty

To place a credit card order call our special toll-free number:

**800-231-7717**

Call toll-free in California:

**800-552-8885**

☐ VISA ☐ MasterCard ☐ Check Enclosed

Card Number _____ Expiration Date _____

Signature _____

Name _____

Address _____

City _____ State _____

Zip _____ Phone _____

**DEALER INQUIRIES WELCOME**

LOGITECH

LOGITECH, Inc.
805 Veterans Blvd. Redwood City, CA 94063
Tel: 415-365-9852

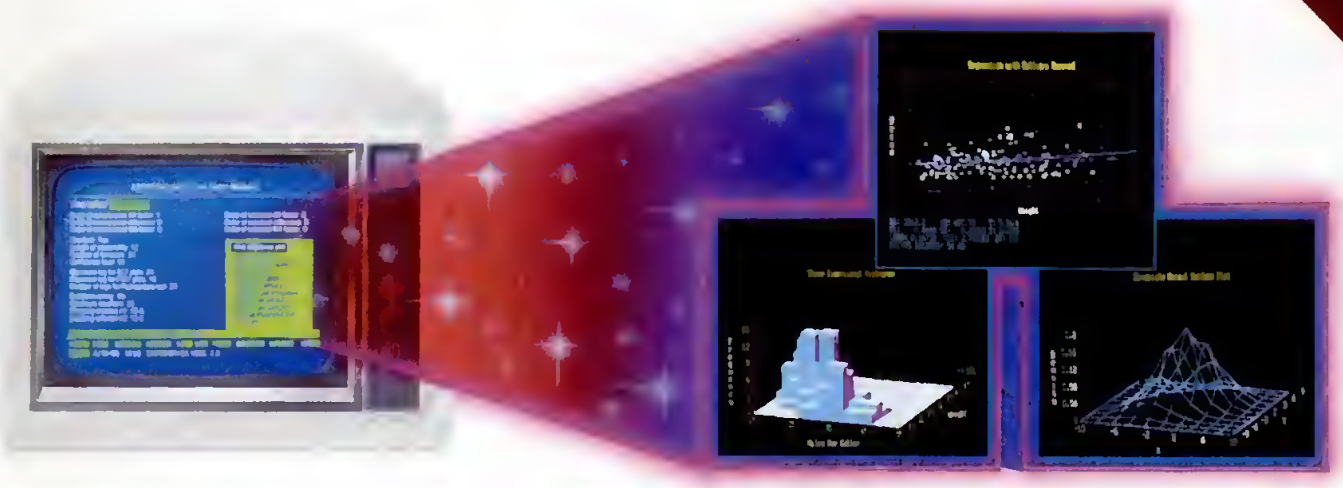
**In Europe:**
LOGITECH SA, Switzerland
Tel: 41-21-879656 • Telex 458 217 Tech Ch

**In Italy:**
Tel: 41-21-879656

**CIRCLE 182 ON READER SERVICE CARD**

# STATGRAPHICS®

NOW! Faster, More Procedures, Improved Data Management!



## Powerful Statistics, Sophisticated Graphics In One Complete Software System

STATGRAPHICS from STSC is simply the most complete and powerful statistical software available for your PC. STATGRAPHICS integrates powerful statistics with high-resolution color graphics—in one single software system—to give you an extraordinarily powerful analytical environment.

***"[STATGRAPHICS] is unusually complete as software systems go in terms of statistical capabilities."***
(PC Week)

With more than 250 statistical and mathematical procedures, STATGRAPHICS offers you the power and precision of mainframe software—right on your PC. All the tools you need for comprehensive statistical analysis: ANOVA, complete regression analysis, experimental design, quality control procedures, multivariate techniques, nonparametric methods, and extensive forecasting and time series analysis, including Box-Jenkins.

***"I've found STATGRAPHICS to be one of the most complete and easy-to-use statistics programs that I have come across."***
(Whole Earth Software Catalog)

All this statistical power is even more valuable with STATGRAPHICS' unique interactive environment. STATGRAPHICS is completely menu-driven so you can get into your statistical analysis work quickly and be productive right from the start. You can easily go back and forth between your numerical and graphical analysis—change variables as many times as you want—and see the effect immediately.

You can also enter and access data easily. STATGRAPHICS has a full-screen data editor and interfaces with standard ASCII files, Lotus® 1-2-3® and Symphony® worksheets, and dBASE® files.

***"Verdict: [STATGRAPHICS is] a model PC software system which will set standards for PC statistical software."***
(PC User Magazine)

STATGRAPHICS offers you a wide variety of graphics capabilities to help you visually analyze your data—more options and more sophistication than any other PC statistical software. Included are histograms, two- and three-dimensional line and surface plots, scatter plots, time sequence plots, quality control charts, as well as bar and pie charts. STATGRAPHICS supports a wide range of graphics boards, printers, and plotters.

For the most complete, advanced statistical graphics software system available, order STATGRAPHICS today. To order, contact your local dealer. If they don't have it, tell them to call STSC toll-free.

**(800) 592-0050**
**In Maryland or Canada call (301) 984-5123.**

### *STATGRAPHICS—the best overall choice!*

| | Integrated Statistical Graphics | Direct Lotus & dBASE Interfaces | Menu-Driven | Minimum Hardware Required | Helpline Support | U.S. Suggested Retail Price |
|---|---|---|---|---|---|---|
| STATGRAPHICS | ✓ | ✓ | ✓ | Dual Floppy Disk | ✓ | $795* |
| SPSS/PC+™ | NO | NO | NO | 10 Meg Hard Disk | ✓ | $1385 |
| SAS®/PC | NO | NO | ✓ | 20 Meg Hard Disk | ✓ | $2700+ Annual Maintenance Fee |

*Data compiled as of April 1986*

CIRCLE 487 ON READER SERVICE CARD

**STSC**

*Available nationally through Softsel and distributors worldwide. Dealer inquiries welcome.*

*International prices slightly higher. STATGRAPHICS, SAS, and dBASE are registered trademarks of Statistical Graphics Corporation, SAS Institute Inc., and Ashton-Tate, respectively. Lotus, 1-2-3, and Symphony are registered trademarks of Lotus Development Corp. PLUS*WARE and SPSS/PC+ are trademarks of STSC, Inc. and SPSS Inc., respectively.

**A PLUS★WARE™ PRODUCT**

RCA Mail aims its services at multisite companies with a minimum of 50 to 100 locations.

make sure that the application is appropriate for the company and for its personnel. An employee is then assigned to be the administrator of the system and to supervise such features as security levels and distribution lists. RCA also can supply menu-driven communications software that is preprogrammed with information specific to the company's needs. The system can, however, be accessed using any communications software.

RCA Mail is a command-driven system that provides a great deal of user flexibility. It accepts only text files but has full on-line editing facilities and a variety of e-mail features, including urgent classifications, return receipts, and deferred messages (which are frequently used as a calendar service by subscribers who send themselves timed messages). There is access to both private and shared address lists, as well as a search facility for subscriber names. Users have the ability to create scripts themselves, with help from RCA if they have trouble dealing with the programming. If they have any problems that can't be handled by the on-line help files, they can call an 800 phone number that is available during business hours.

Messages sent and received are stored automatically and will remain as long as the user wishes; after 5 days, an extra fee is charged. Unread messages will be held for as long as a month, after which they will be automatically stored in the user's file. Draft messages left in the work-space can be recovered within 24 hours.

RCA Mail's bulletin board service is available for each company, but must be set up in advance. There is direct access to telex services and, as part of the telex access, to RCA's Hotline database (overseas, Hotline is replaced by the FY1 database). Hotline includes information in a multitude of categories, including financial news, travel visas and plane reservations, and a medical encyclopedia. Access to this service can be restricted, if desired, by the in-house administrator.

RCA recently experimented with a more public e-mail system called RCA Mail for PCs, which provided the same service for individual subscribers. However, the company found that such a service was not practical for either RCA or its customers, and so withdrew it, preferring to concentrate on its corporate users.

PC MAGAZINE FACT FILE

**RCA Mail**
RCA Global Communications Inc.
201 Centennial Ave.
Piscataway, NJ 08854
(800) 526-3969
CIRCLE 655 ON READER SERVICE CARD

## Telemail

First established in 1979 as an in-house application for the GTE Telenet Communications Corp., Telemail now boasts approximately 200,000 users worldwide. It offers a wide range of traditional e-mail services, including uploading of both text and binary files, a user directory service, address listing, deferred message sending, message storage, and forms capabilities (Telemail recently announced the availability of a "library" of forms that users can tap into).

According to Telemail representatives, the service offers subscribers a large network of user support, including field consultants who develop customized applications, a national training program that holds classes on specific days of the month in about 14 U.S. cities, a support service operating out of Reston, Virginia, and a variety of PC-based training aids. Although no specific software is needed to use Telemail, GTE Telenet is marketing a communications product called *PC-Telemail*, which includes a word processor, filing system, and unattended send/receive capabilities.

PC MAGAZINE FACT FILE

**Telemail**
GTE Telenet Communications Corp.
12490 Sunrise Valley Dr.
Reston, VA 22096
(800) 835-3638
CIRCLE 664 ON READER SERVICE CARD

Users of the service are issued individual IDs and passwords, which are monitored by an in-house administrator. They have access to all users of the Telemail system, not just those in their own corporation—an indication that GTE Telenet seems to be bucking the trend against individual e-mail systems. In fact, GTE Telenet recently introduced a pricing alternative that would permit subscriptions to be issued on an individual, rather than a strictly corporate, basis. The package allows users to bypass the $500 minimum charge and offers low monthly charges, too.

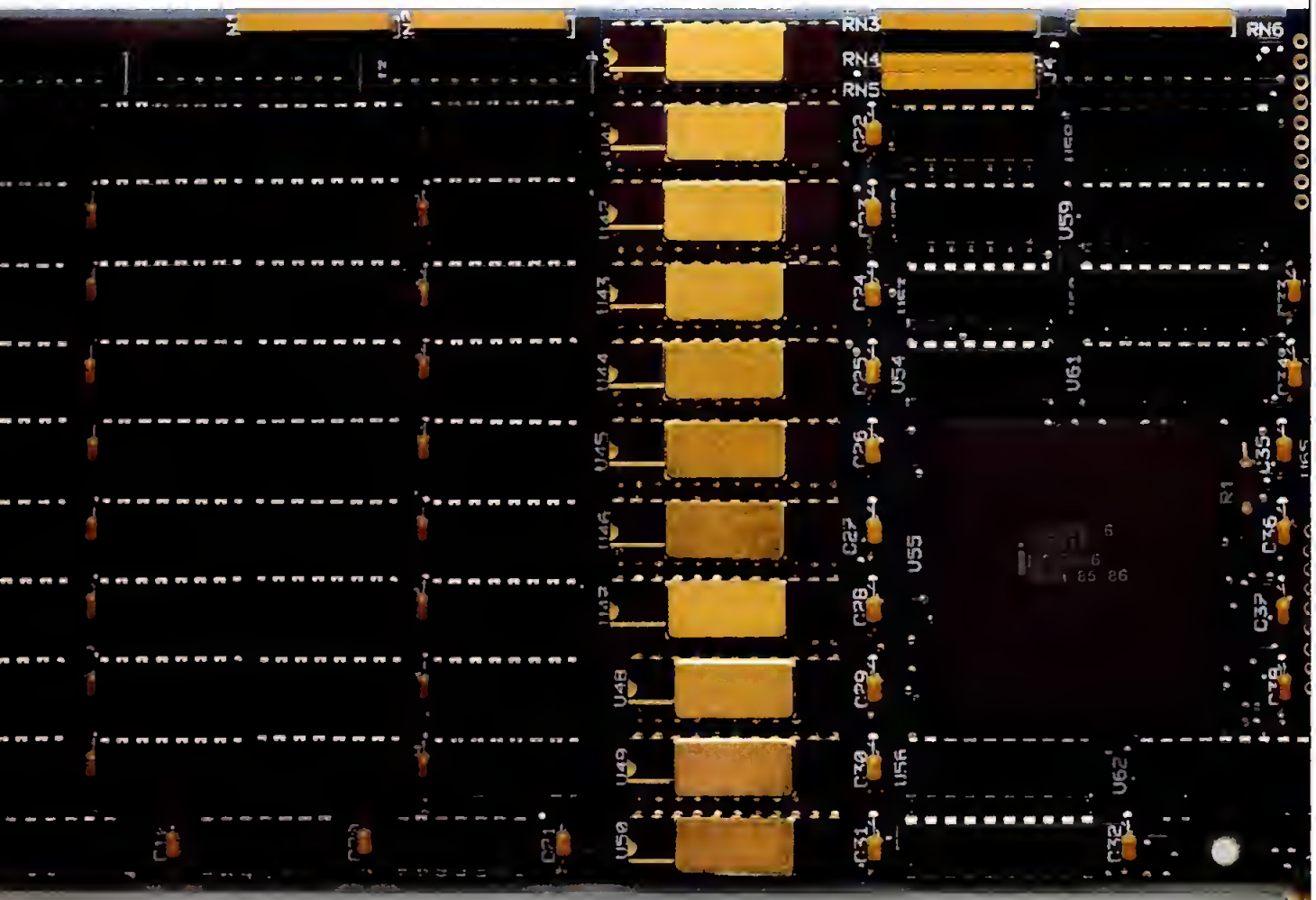
The service also includes several unusual on-line features, including "hierarchical registration," which allows companies to register users in groups that correspond to the way the company is organized. Sales organizations can have their own bulletin board, their own scripts, and their own forms, and access can be restricted to or from the people in that sales organization. Detailed accounting of service use is also available.

Other features include Telemail Xpress, which lets users send laser-printed hard-copy through the U.S. Postal Service, and a gateway system that allows subscribers to gain access to either outside information networks or private databases.

Three years ago, GTE Telenet introduced an interconnection to other systems based on the x.400 communications standard. A GTE Telenet representative said the company's 20 foreign installations would eventually be connnected to the U.S. service. PC

*Barbara Krasnoff is a frequent contributor to* PC Magazine.

# How to 386




It's simple.

With Intel's Inboard™ 386/AT.

It fits right into your IBM® AT or compatible, and gives you all the performance of a 386 system.

Without having to buy a 386 system. (Which, if you've priced one lately, is about three times as expensive.)

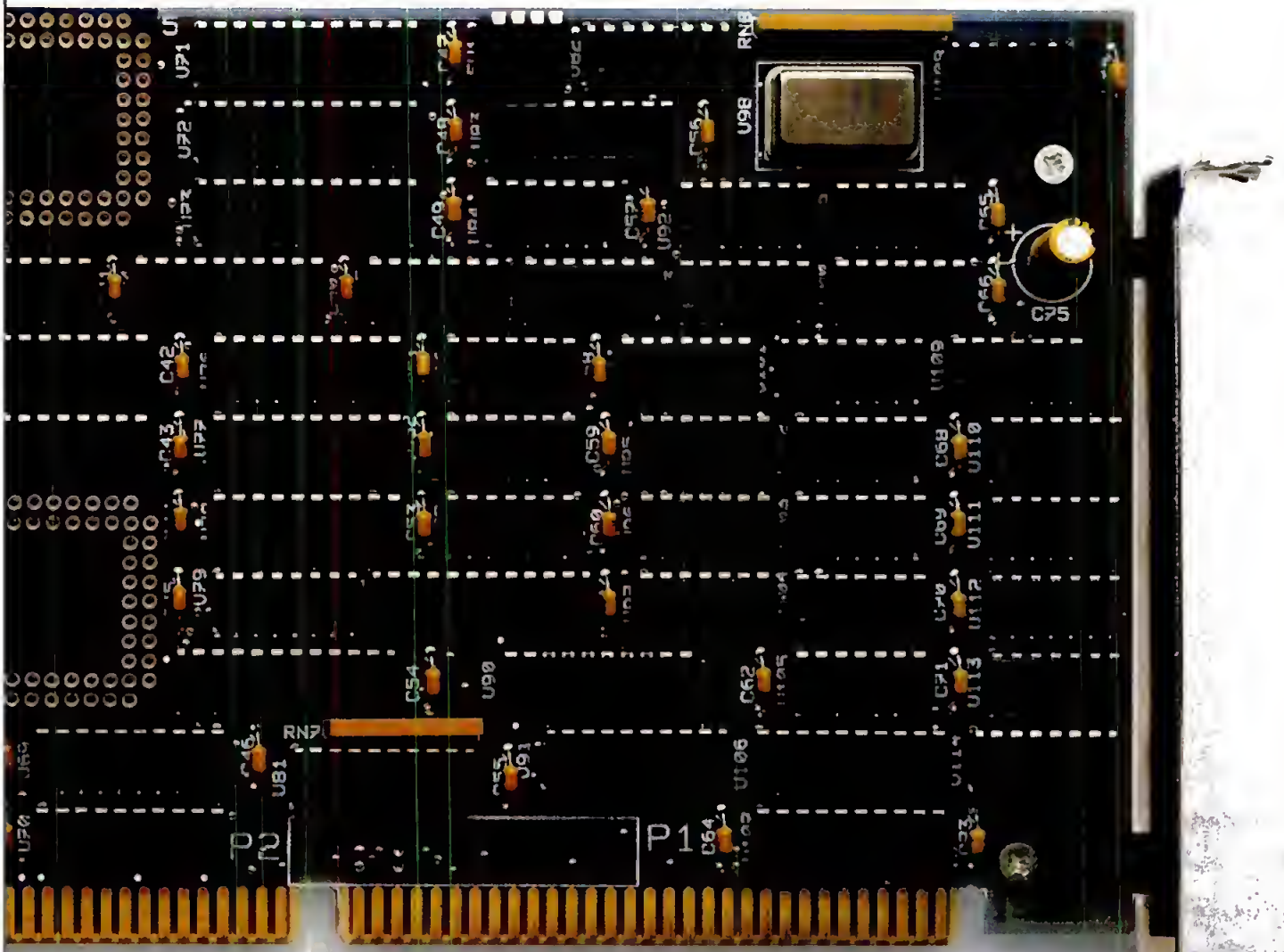
Inboard 386 is based on the revolutionary 32-bit, 16 MHz 80386 chip *we* invented. So it'll work with all the software you've got sitting on your desk. As well as any add-in boards you may have hiding in your computer—like, just for instance, the Above™ Board. Which we also invented.

Inboard 386 lets you whiz through recalcs with Lotus® 1-2-3.® And it makes your network server serve you even faster. In fact, it'll make any program serve you faster.

And with 386 control software,

Inboard and Above are trademarks and Intel a registered trademark of Intel Corporation. IBM is a registered trademark of International Business Machines Corp. Lotus and

# your AT.




you can take advantage of exceptional multitasking capabilities. Like putting together a presentation while your computer is downloading data. (A slightly more efficient way of doing business.)

Don't forget our five-year warranty. Or toll-free technical support line.

To find out more, check with your favorite computer dealer or call us at (800) 538-3373.

And see why Inboard 386 beats the system.

intel

1-2-3 are registered trademarks of Lotus Development Corp. © 1986 Intel Corporation

CIRCLE 511 ON READER SERVICE CARD

**WITH OR WITHOUT HIS CLONE SUIT,** our AMT jr. has more on the ball than his big brother.

Offering top quality in design, components, materials, and construction, this feature-packed model is based on an Intel 8088-2 (or NEC V20-8) CPU, running at 4.77 MHz or 8 MHZ, selectable: handles PC DOS®, MS DOS®, XENIX®, and other operating systems, plus a full range of IBM-compatible software.

The standard system has a "0" wait state on memory, and operates many times faster than the IBM PC/XT®. Offers 640 KB of RAM on the motherboard; 360 KB floppy disk drive; eight expansion slots; LED indicator for the turbo mode; PC AT® style keyboard; 135-watt integral power supply; and security key lock. Optional features include 20 MB to 120 MB of hard disk, Phoenix® BIOS, EGA, and an 8087-2 math co-processor.

And for reliability, every AMT jr. is burned-in at the factory prior to shipment.

No IBM®-compatible system gives you more capability and value for your dollar than our incredible AMT Jr.

## AMT-386™

**Superfast PC at superlow price!**

**$2995.** AMT's top-of-the-line system features Intel's phenomenal new 80386 chip with a superfast 16/6 MHz switchable clock. Included are 1 MB of RAM expandable to 4 MB, on the motherboard; 1.2 MB floppy disk drive; "0" wait state using a 64 KB cache; facilities for up to 180 MB of hard disk; socket for a math co-processor; and a full range of optional peripherals, accessories, and expansion products.

## AMT-286™ New faster 10/6 MHz switchable clock

**$1099.** This powerful, full-featured system offers many of the same attractions, benefits, and options as the AMT-386. Based on an Intel 80286 CPU running at 10/6 MHz, switchable (ultra-fast 12/6 MHz optional); 640 KB of RAM, expandable to 1 MB; 1.2 MB floppy disk; and accommodations for up to 120 MB of hard disk. Phoenix® BIOS optional.

## LAP/PRO 10™

**$1499.** Powerhouse IBM®-compatible in a fully portable package. Standard AC model has a 16-bit 80186 CPU; 640 KB of RAM; dual 5.25-inch, 360 KB floppies; 96-pin expansion port; serial and parallel communication ports; high-contrast, 80 x 25 back-lit LCD with 640 x 200 resolution; and 83-key enhanced keyboard. Options include Super Twist screen and 300/1200 baud modem. 20 MB hard disk model (LAP/PRO 11™) also available. Perfect computer for busy professionals or on-the-go executives.

**DON'T WAIT — CALL NOW**

Pick up your phone now and get full details or place your order.

**AMERICAN MICRO TECHNOLOGY**
14751 Franklin Avenue
Tustin, California 92680

Phones: Corporate Headquarters
(714) 731-6800,
In LA call (213) 477-6320,
In Bay area (415) 490-7967
TWX 5106003265 AMT USA

* Prices and availability subject to change without notice

®Reg. trademarks—IBM, IBM PC, IBM PC/XT, IBM PC AT, PC DOS: International Business Machines Corporation; MS DOS, Xenix: Microsoft; Phoenix BIOS, Phoenix Technologies Ltd.

CIRCLE 507 ON READER SERVICE CARD

# *Background Communications:* INVISIBLE E-MAIL

*These five multitasking software packages let you compute in the foreground while they do your communications in the background—but which ones accomplish this with the least conflict and the most sophistication?*

Ever find yourself waiting for your computer to finish transferring a long file so that you can get to your database? Are there times when you'd like to attack dial a busy bulletin board or voice number but can't afford to stop writing the report you're working on? Would you like to set up your own e-mail system but don't have a computer to dedicate to the task?

The solution to each of these problems is a communications program that stays in memory, running behind your main application and automating communications functions.

Programs like *SideKick*, *ProKey*, and *Turbo Lightning* have conditioned users to equate memory resident with terminate-and-stay resident. Call up *SideKick* while you're in the middle of another program, and the other program hangs up and stops working. Leave *SideKick*, and the other program picks up where it left off, while *SideKick* hangs up and stops working.

This approach stands in contrast to multitasking, in which two or more programs operate concurrently. Multitasking is accomplished through time-slicing, meaning that the CPU splits its attention between programs. Only one program is actually operating at any given instant, but both programs can continue doing their jobs as the CPU switches back and forth.

If *SideKick* had multitasking, you could use its dialer to attack dial a busy number in the background while you worked on other matters in the foreground. *SideKick* can't do that, of course, but a growing number of programs can handle communications as a background task, letting you use your computer for something else, even while communications are continuing. If necessary, you can even run these programs from a floppy disk, though a hard disk is highly recommended.

# BACKGROUND COMMUNICATIONS WITH YOUR FAVORITE PROGRAM

What happens if you like the idea of background communications but don't want to give up the communications program you already have? Well, you might be able to have it both ways. *DESQview*, a $99.95 program from Quarterdeck Office Systems (150 Pico Blvd.; Santa Monica, CA 90405; (213) 392-9851), works with DOS to provide true multitasking with standard DOS programs, giving background communications capabilities even to *PC-Talk III*. As with the multitasking communications programs, this sometimes leads to system crashes but it usually works.

Basically, *DESQview* divides your computer's memory into separate chunks and lets you run different programs in each chunk. It also controls the screen, so that you can switch from one program to another or see more than one program at a time, each in its own window.

Unfortunately, not every communications program will work well with *DESQview*. Many programs (of all kinds) gain efficiency by doing an end run around DOS. Instead of controlling the screen through DOS, they talk to the hardware directly. But for *DESQview* to control the screen, it has to intercept all information going there. If a program sidesteps DOS, it also sidesteps *DESQview*, and it will write information to the screen in the middle of another program's window.

With most such programs, *DESQview* handles this problem by suspending the program's operation whenever its window is smaller than a full screen. But if you tell *DESQview* to do this with a communications program, you lose the background capability you were really trying for.

On the bright side, *DESQview* will provide multitasking for a fair number of communications programs, either because they are well behaved (going through DOS for screen control) or because they are popular enough so that Quarterdeck has written a short .COM file that loads with the program and makes it work with *DESQview*.

A quick test of several communications programs showed that *PC-Talk III*, *Crosstalk XVI*, Version 3.6, *Ascom*, Version 2.2, and *HyperAccess*, Version 3.3, all work well with *DESQview*. Some of the programs that didn't work well include *Microsoft Access*, *Omniterm*, and earlier versions of *Crosstalk*.

Even some programs that aren't well behaved are marginally useful for background communications with *DESQview*. Hayes's *Smartcom II*, for example, will write indiscriminately over your screen when receiving text. But it will let you send a text file without interfering with other windows. When the file is finished, the "Send Complete" message will come through on another window, but that interferes with only one line. You might even prefer having this message, since it automatically lets you know the job is finished.

Similarly, you can work on another program during protocol file transfers, since *Smartcom* will write only the one-line status messages on your screen. When the file transfer finishes, *Smartcom* rewrites the whole screen, but here again, you might want to switch back into *Smartcom* at that point anyway.

The moral is you have to try your communications program with *DESQview* to see how well the two work together. If you like the results, it may save you having to learn a new communications program. And with *DESQview*, you'll find other benefits of multitasking as well.—**M. David Stone**

*Alexander-Plus Data II*, *BackComm*, *Relay Gold*, *Relay Silver*, and *SideTalk* all fall into this category. Even better, they all include sophisticated script languages that can handle just about any communications need unattended. Three of these programs—*SideTalk*, *BackComm*, and *Relay Gold*—were reviewed in *PC Magazine*'s most recent overview of communications software (See " Asynchronous Communications: Shopping for Software," *PC Magazine*, Volume 5 Number 18). In those reviews, the programs were evaluated as general-purpose communications software. This second look focuses on background communications features found in these programs, and it includes two new programs that have become available since that review.

## Alexander-Plus Data II

Like *Relay Gold* and *Relay Silver*, Omzig Corp.'s *Alexander-Plus Data II* is a second-generation product that benefits from a long history of user feedback. And like the two versions of *Relay*, *Alexander-Plus* has a far more polished feel than either *SideTalk* or *BackComm*.

If you haven't heard of *Alexander-Plus* before, it's probably because the earlier incarnations of the product were targeted at telex, TWX, and integrated voice and data PBXs. What's more, the products were sold outside the United States—more than 25,000 copies of *Alexander-Plus Data II* have been sold in Canada, Europe, Australia, and New Zealand. *Alexander-Plus Data II* is the first *Alexander-Plus* program that is aimed at general-purpose asynchronous communications. And it's the first that is being marketed in the United States.

As of this writing, *Alexander-Plus Data II* is not available in the United States, although it should be by the time you read this. The version provided for review was designed for Canada, and although the program itself is identical to its U.S. twin, the total package is not.

In particular, the Canadian version includes a set of predefined macros for iNet, EOS, and other services that are available in Canada but not in the United States. Other macros for more-familiar services are also designed for Canadian users. The macro for calling MCI Mail, for example,

# In Retirement Memories Abound

# Retire Your PC Coax Connection

The PC-to-host coax connection. She was a good piece of equipment working with coax cable and cluster controllers, but time just passed her by. End users started needing more than simple host access. They also needed their PCs to share resources around the office. That's when local area networks came along to fill the need.

LANs are dramatically increasing office productivity through efficient information management. And Gateways are exploiting LAN versatility by providing cost-effective host communication for PCs and other network devices. Now for thousands of dollars less, LANs and Gateways provide PC-to-PC and PC-to-host communications all without a cluster controller.

INS Gateway PC Adapters are engineered around proven INS SNA 3274 cluster controller emulation. A single INS Gateway PC Adapter in an IBM NETBIOS compatible LAN, including Token Ring, will support up to 32 logical unit sessions. The LAN allows each PC on the network to share disks, printers and other resources while the Gateway allows performance of any host-supported function and maintains host access.

INS planned on PCs becoming a major component in the development of information systems. We designed our Gateways to be the logical choice in providing the vital link between LANs and mainframes. We also planned on much more—flexibility, simplicity and reliability. We provide free, responsive user assistance and guarantee every INS Gateway PC Adapter (hardware and software) for five years.

Now the vast resources of mainframes and local area networks are available at your fingertips with INS Gateway PC Adapters.

Call now for more information about putting new life in your MIS/DP efforts with INS Gateway PC Adapters. Our toll free number is (800) SNA-3270, in Alabama (205) 633-3270. Or write Integrated Network Systems, P.O. Box 91395, Mobile, AL 36691. Telex: 701238.

INS

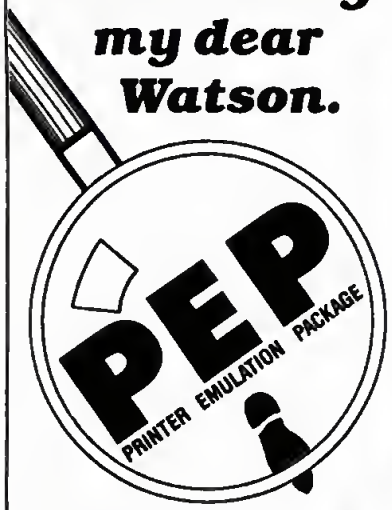
"THE NETWORK PEOPLE"

An ICOT Company

CIRCLE 128 ON READER SERVICE CARD

**Moving Data to your PC?**

***Elementary my dear Watson.***




*Watson, the simplicity of this software is absolutely brilliant! PEP lets your PC respond like a serial printer, to capture data from any other computer.*

*Think of it! Now you can move data from your portable, another micro, or even a mainframe, running almost any application. And the only hardware requirements at your PC are 192K memory and an RS-232 interface.*

*And at* **$59.95** *(plus $5 shipping) Watson, well frankly it would be criminal not to try it!!!*

Not copy protected

**INTELPRO**

**13 Saratoga Drive**
**Kirkland, Quebec**
**Canada H9H 3J9**
**(514) 694-6862**

CIRCLE 223 ON READER SERVICE CARD




# LOTUS EXPRESS: AN INTELLIGENT MCI-MAIL FETCHER

If your communications service of choice is MCI Mail, *Lotus Express* is the ideal background transfer program.

*Express* dials MCI Mail every few hours (you set the interval), pulls in waiting messages, and stores them as individual disk files. A summary screen lists the date, sender, and topic of each message. Outgoing messages are uploaded a few minutes after they're created.

Unlike MCI Mail used outside of *Express*, the service and program together let you transfer binary files, such as spreadsheets or word processor documents, with the formatting intact. *Express* uses the X.PC error-correcting transfer protocol to insure a glitch doesn't turn $1,000.00 into $100,000. That means people who routinely send critical data now have a hassle-free alternative to stuffing disks in an overnight pouch or arranging a PC-to-PC transfer that usually involves three phone calls to arrange, transfer, and confirm.

Foreground programs slow down or stop for a few seconds at a time when *Express* is active, and *Express* gobbles up about 200K bytes of RAM (conventional only, not expanded), but otherwise you'll never know it's running.

**—Bill Howard**

PC MAGAZINE FACT FILE

***Lotus Express***
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
(617) 577-8500
**List Price:** $100, including 1-year subscription to MCI Mail, plus transmission charges.
**Requires:** 256K RAM (320K for DOS 3.0 and above), Hayes-compatible modem, MCI Mail account.
**In Short:** The easiest, most reliable way to use MCI Mail. Allows binary-file (spreadsheets, .COM, and .EXE) transfer. Not copy protected.

CIRCLE 450 ON READER SERVICE CARD

calls through Datapac, a Canadian equivalent of Tymnet.

The U.S. version of *Alexander-Plus Data II* will have its own set of macros. These were not available to test except in a limited way. That's unfortunate, because much of the program's appeal is the degree to which it makes life easy for the communications novice. Without the complete package to test, it's impossible to judge how well the program will live up to its promise.

Like the other programs reviewed here, *Alexander-Plus* provides true multitasking—but only for itself while in the background. There is no option for adjusting the amount of time given to foreground and background tasks. (At least no documented option. According to a spokesman for Omzig, the feature *is* available as a command-line switch, but it is meant only for advanced users and is not documented in the user manual.)

Unless told otherwise, *Alexander Plus* loads in its resident mode, leaving you at the DOS prompt. A simple command-line switch will tell the program to load in its nonresident mode instead. As with *SideTalk*, once *Alexander-Plus* is loaded in resident mode, there is no way to unload it without rebooting the system or using another program to do the work.

The default hot key combination for *Alexander-Plus* is Shift-Shift. This will come as a less-than-joyful surprise to *SideKick* users. On the plus side, the hot key can be changed to any of several other combinations—I chose Alt–Right Shift. However, regardless of the setting, when you load *Alexander-Plus* it signs on with a reminder to press Shift-Shift to call up the program.

*Alexander-Plus* performed better than *SideTalk* or *BackComm* on the compatibility tests that we ran but not quite as well as *Relay Gold*. The only problem that I ran

# That Was Then And This Is Now.

## Introducing WordStar® Professional Release 4.

You remember when we first came out with WordStar. From day one it became, as some described it, a classic. Over one and a half million of you snapped it up.

But that was then and this is now.

And now there's a new WordStar. WordStar Professional Release 4 for the IBM PC and compatibles. With the same familiar command sequence and file format you've grown to love. Yet with all the improvements you've been asking for.

You're going to have a field day.

## With over 125 new features, it's like a wish list come true.

Imagine, a WordStar Professional with, increased speed, undo, keyboard macros, Word Finder™ Thesaurus, line/box drawing, improved printer support, multi-line headers and footers, and onscreen boldface/underlining.

Catch your breath. We're not done.

There's also 14 function math, subdirectory support, go to page, and an improved spelling correction and MailMerge. There's even an optional 40 function key interface. Not to mention over 100 other enhancements.

## And it's got people in the know talking.

People like Michael J. Miller of InfoWorld,* who described WordStar Professional Release 4 as "faster than ever" and "good enough to cause a WordStar revival."

There's even more good news. If you already own WordStar or WordStar Professional, $89 and your present serial number let you update to Release 4. We've even included an order form below. It's our way of introducing a new dedication to our customers. It's our way of saying there's a new MicroPro.

WordStar Professional Release 4.

Let's hear it for new beginnings.

MicroPro.

*February 16, 1987 issue

ORDER YOUR UPDATE NOW! Complete the information below and, along with your check or money order, mail to MicroPro, Order Update Department, P.O. Box 7079, San Rafael, CA 94901-0079 Or call us toll free at 800-227-5609 or 800-343-3000 Ext. 652 to order. Allow 3-4 weeks for delivery.

Customer Name _____ Company Name _____

Address _____ Telephone (____) _____

City _____ State _____ Zip _____

Indicate: ____ 5¼ disk format ____ 3½ disk format

WordStar Serial # _____ or include title page of your WordStar Reference Manual.

| | |
|---|---|
| Release 4 | $89.00 |
| Tax* | _____ |
| Shipping/Handling $5.00 | _____ |
| Total | _____ |

*Only states shown require sales tax: CA, GA, IL, MA, NJ, OH, TX, and VA.

**CIRCLE 502 ON READER SERVICE CARD**

into was with *Microsoft Word*.

At first, *Alexander-Plus* clashed completely with *Word*, freezing the screen and forcing me to reboot. This annoying failure wasn't consistent, however. At other times I was able to load *Word* without any problems, call up *Alexander-Plus*, and then go back to *Word* with only a slightly garbled screen. In these tests I was able to fix the screen by using *Word*'s Library Run command to reset the screen.

In still other tests, with *Word* in text mode, the *Word* screen would blink after calling up *Alexander-Plus* and then go back to *Word*. In these cases, too, *Word* was able to recover by using the Library Run command.

According to an Omzig spokesman, *Alexander-Plus* does not ordinarily have a problem with *Word*. However, the program can be confused if you have both an EGA and a monochrome card in your system, as I did on the system used for these tests. Omzig claims *Alexander-Plus* can handle a CGA and monochrome adapter on the same system without problems. Future versions of the program will also be able to handle an EGA and a monochrome adapter simultaneously.

**MORE THAN A MACRO** *Alexander-Plus* has a misnamed macro feature. By most definitions, "macro" implies a severely limited keystroke-recording capability. But these "macros" include flow control commands, error handling features, and a set of 40 commands that anyone else would immediately recognize as a script language. While the language is not as sophisticated as *SideTalk*'s or *Relay Gold*'s, it is sufficient to handle most communications tasks.

Macro files are created as standard text files, using either the program's built-in editor or your favorite ASCII editor. Before you can run a macro, you have to compile it. Compiling is a simple matter of saving the

PC MAGAZINE FACT FILE

***Alexander-Plus Data II*, Version 1.4**
Omzig Corp.
239 Rue Champlain
Hull, Quebec
Canada J8X3R7
(819) 776-3600
**List Price:** $195

**Requires:** 256K RAM, two disk drives, DOS 2.0 or later. Hard disk recommended.

**In Short:** *Alexander-Plus Data II* is new to the United States but has been honed in other markets. It coexists well with other programs and provides some highly useful innovations in phone management. Not copy protected.

CIRCLE **451** ON READER SERVICE CARD

SideTalk™
It minds the phone while you do your work

No more interruptions! Because now SideTalk can transfer your files or receive your mail while you're using your computer for other important matters. And SideTalk is programmable with its own BASIC-like language. What's more, you're never more than a keystroke away from all of the power of SideTalk.

When we say SideTalk is the best telecommunications program on the market, we're not just talking out of the side of our mouth.

Lattice

*To place your order:*
Lattice, Incorporated
Post Office Box 3072
Glen Ellyn, Illinois 60138
312-858-7950
TWX 910-291-2190

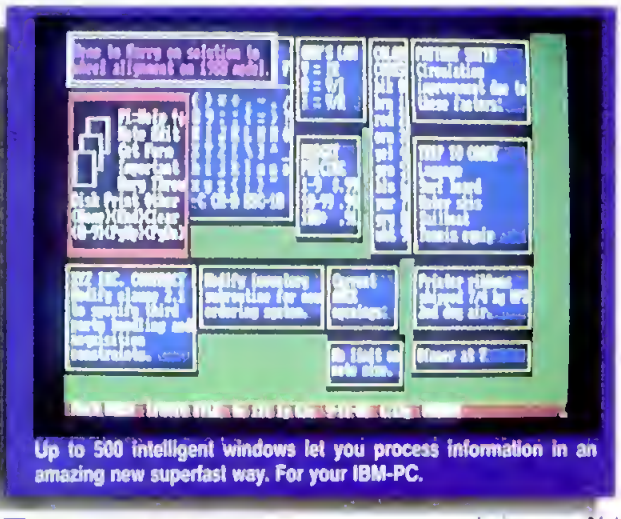
Only $119.95

CIRCLE 371 ON READER SERVICE CARD

*Announcing the first*

# Spreadsheet for Text!

# TORNADO NOTES™



Up to 500 intelligent windows let you process information in an amazing new superfast way. For your IBM-PC.

"excellent value"
Review Board, *InfoWorld 2/23/87*
"fantastically wonderful"
Steve Gibson, *InfoWorld 12/1/86*

**Rave Reviews**

"I heartily recommend it with no reservations"
Dr. Michael Ecker, *Computer Shopper 10/86*

"Product of the month" — "extremely useful"
Will Zachman, IDC, *Software News 7/86*

"a significant productivity tool"
Chris Johnston, *PC Magazine 9/30/86*

"simple ... superfast"
Diment, *New York Times 12/14/86*

**Special Introductory Price $49.95**
$3.50 Shipping

**30-DAY MONEY-BACK GUARANTEE**

## New Concept

Tha alactronic spreadsheet is a graat idea ... if you crunch NUMBERS all day long. But what if you daal with words, thoughts, plans, and RANDOM information? The solution? An optionally mamory-resident softwara packaga that acts like a SPREADSHEET FOR TEXT! It's called Tornado Notes. Imagina 500 INTELLIGENT windows holding all your notes, contacts, ideas, and MISCELLANEOUS information. Imagine building windows; combining them; and searching thru tham lightning fast! Imagina a new FREE-FORM systam that not only improves tha way you work and think—but is FUN too! With it, you REMEMBER more and maka bettar DECISIONS. It's a new PRODUCTIVITY tool that is turning skeptics into fanatics.

## Friendly Power

Tornado Notas lats you do avarything from managing a busy desk, to following up on sales laads, to planning a new invention. In up to 500 windows! You can even do simple wordprocassing. To start a new nota all you do is press N (for Nota)—no cumbersoma fila names—no extra keystrokes. It's quick and easy. And each note has its own window—so you can separata your information. When you need to find a note (or group of ralated notes), all you do is prass G (for Gat) with any word or phrase from any note—you'll see tha search happen as you type! Or you can look through your notes with tha arrow keys in windows that instantly pila up and lift away. These are just three of over 18 features that both beginnars and experts are raving about. But don't lat tha easy commands fool you—Tornado Notas is a powerful productivity tool.

## REAL Intelligence

Wa don't claim any outer-space "Artificial Intelligence". But, whan Harry calls you on tha phona...in two seconds flat, from 287 electronic notes, you'll get the 8 notas on Harry...bafora ha avan finishas his first sentence! That's just REAL intalligence.

## Text Spreadsheet

Tornado Notes has NOTHING to do with programs that maka outlines or "attach" notes. It's lika a spreadsheet for taxti And it's as far ahead of "residant notapads" as Lotus 1-2-3™ is from an ABACUS!

## Serious Fun

Tornado Notas is fun to use. But most important, it becomes a focal point for whatavar you do, with a surprisingly wide-spread effect on tha way you work and think. Usar surveys show you may well use Tornado Notes more than any othar software package! Ordar today.

**SPECIFICATIONS**

**FEATURES:** unlimited note size, scrolling within window, auto word wrap, cut & paste, time & date stamp, nota forms, foreground data exchange, join & dup notes, import & export ASCII & Wordster, mono or selectable color, definable Hot-key, non-resident option, LAN support, context help, supports extended ASCII, smart adjustable windows, parallel text processing, progressive resolution searching without keywords, and more. **COMPATIBILITY:** IBM-PC/XT/AT and compatibles; mono, CGA, text EGA, and Hercules graphics displays; 57K minimum RAM. **CAPACITY:** Up to 500 short notes per pile - 676 piles. **SPECIAL APPLICATIONS:** software development, "Tornado" expert systems, customer support terminals, message centers, information desks, electronic notebooks, etc

☐ **YES,** send me ___
Tornado Notes at $49.95 each plus $3.50 shipping ($10 outside USA & Canada). NJ residents add $3.00 tax. No purchase orders. To order, mail coupon or call (800) 342-5930.

**Payment:** VISA MC Check

Credit Card Expiration _____

Card # _____

**Not Copy Protected**
**30-Day Money-Back Guarantee**

Name: _____

Address: _____

_____

City: _____

State. _____ Zip: _____

Telephone: _____

MICRO LOGIC corp
**Dept T34, 100 2nd St., POB 174**
**Hackensack, Naw Jersey 07602**

MICRO LOGIC corp
Dept T34, 100 2nd St., POB 174
Hackensack, Naw Jersey 07602

TO ORDER CALL: **(800) 342-5930** VISA/MC ACCEPTED
Technical questions & NJ residents: (201) 342-851[illegible]
24 hour modem orders: (201) 342-[illegible]
**Dealer Inquiries Invited**

© 1986 Micro Logic European marketing by Atlantex Inc (203) 655-6980 Trademarks: Lotus 1-2-3 — Lotus Development Corp IBM-PC/XT/AT — IBM

# UNLOCK™ Products Remove Copy Protection

## RUNS YOUR SOFTWARE ON ANY HARD DISK

UNlock "copying" disk allows you to make "unprotected" DOS copies of popular original program disks. Unprotected backup copies perform perfectly, as do copies of these copies. UNlock copies run on any hard disk, including Bernouli Boxes. No original required in drive "A". Run on any RAM disk simply and conveniently. Also, copy DOS 5¼" programs to 3½" diskettes. For IBM®, PC, XT, AT, compatibles, 256K or more, DOS 2.1 or higher. Back-ups don't require tedious uninstalls, and reorganizing your hard disk doesn't result in your software calling you a thief! Back-ups are as easy as the "COPY" command in DOS.

**Guaranteed to work only with programs below:**

**UNLOCK™ ALBUM "A" PLUS** — **$69.95** (Plus $4 ship/handling. Foreign orders $10)

- dBASE III & dBASE III PLUS™ (1.0)
- FRAMEWORK I & II™ (1.0)
- CHARTMASTER (6.1, 6.2)
- SIGNMASTER™ (5.1)
- FASTBACK™ (5.3)
- HARVARD TOTAL PROJECT MGR.™ (1.10)
- THINKTANK™ (2.0, 2.1)
- LOTUS 1-2-3™ (1.A, 1.A*, 2.0, 2.01)
- IBM WRITING ASSISTANT™ (1.0, 2.0)
- IBM FILING ASSISTANT™ (1.0, 2.0)
- IBM REPORTING ASSISTANT™ (1.0, 2.0)
- GRAPHWRITER™ (4 3, 4.31)
- REALIA COBOL™ (1.2, 2.0)
- MULTILINK ADVANCED™ (3.02, 3.03)
- DOLLARS & SENSE™ (2.0)

**UNLOCK™ ALBUM "B" PLUS** — **$69.95** (Plus $4 ship/handling. Foreign orders $10)

- SYMPHONY™ (1.1, 1.2)
- CLIPPER™ (THRU WINTER '85)
- LOTUS 1-2-3 REPORT WRITER™ (1.0)
- DOUBLEDOS™ (ALL)
- smARTWORK™ (1.0 Rev. 8 thru 10, 1.1, 1.2 Rev. 3)
- DISK OPTIMIZER™ (1 4, 1.5)
- MANAGING YOUR MONEY™ (ALL)
- MICROSOFT WORD™ (1.15, 2.0, 2.01)
- PFS: ACCESS™ (1984, C)
- PFS: PLAN™ (Tandy, B, C, 2.00)
- PFS: WRITE™ (Tandy, 1.00, 1.01, C, 2.00)
- PFS: REPORT™ (Tandy, 1.00, B, C)
- PFS: FILE™ (Tandy, B, C)
- DATABASE MANAGER II — THE INTEGRATOR™ (2.0, 2.02)

**UNLOCK™ ALBUM "D" PLUS** — **$74.95** (Plus $4 ship/handling. Foreign orders $10)

- dBASE III & dBASE III PLUS™ (1.0)
- FRAMEWORK I & II™ (1.0)
- CLIPPER™ (THRU WINTER '85)
- FASTBACK™ (5.3)
- CHARTMASTER™ (6.1, 6.2)
- SIGNMASTER™ (5.1)
- DOLLARS & SENSE™ (2.0)
- SYMPHONY™ (1.1, 1.2)
- LOTUS 1-2-3™ (1.A, 1.A*, 2.0, 2.01)
- LOTUS 1-2-3 REPORT WRITER™ (1.0)
- DOUBLEDOS™ (ALL)
- HARVARD TOTAL PROJECT MGR ™ (1.10)
- MANAGING YOUR MONEY™ (ALL)
- THINKTANK™ (2.0, 2.1)
- MICROSOFT WORD™ (1.15, 2.0, 2.01)

Now, the most comprehensive copy protection removal program ever created. **$159.95**

**UNLOCK™ MasterKey** — **Introductory Price** (Plus $5 ship/handling)

Breaks over eighty programs including Lotus 1-2-3™, Symphony™, PCFOCUS™, AUTOCAD™, REDBOARD™, CAP™, Clipper™, and smARTWORK™ to name just a few. In addition, generic copy busters for ProLok™ and Super Lock™ have been included. With MasterKey, you can break many more programs than before. MasterKey, from TranSec Systems, gives you UNlock's solid performance and more.

CHOICE OF THE CRITICS!

**PERSONAL COMPUTING** "UNlock has two particularly endearing characteristics: It works, and works simply. I was able to quickly produce unprotected copies of Lotus 1-2-3 release 2, Symphony 1.1, Microsoft Word 2.0, dBase III 1.1, and Framework II. These copies performed flawlessly, as did copies of these copies."
Christopher O'Malley
PERSONAL COMPUTING, April '86

**PC MAGAZINE** "Because copy protection can interfere with the ability to back up a hard disk, business-oriented users may prefer programs like TranSec's UNlock series."
Winn L. Rosch
PC MAGAZINE, May 27, 1986

**BYTE** "UNlock 4.7 defeats the latest Prolock and SuperLock type of copy protection scheme. It's menu-driven and works fine on the programs it's suppose to work on: Lotus 1-2-3, dBase III, Framework, Symphony, Paradox and several others."
Jerry Poumelle, BYTE, Feb. '86

*Recommended by the editors of:*
PERSONAL COMPUTING
"The Best Software Utilities for Under $100"

ORDER TODAY TOLL FREE:
TRANSEC™ UNLOCK™
**1-800-432-0772**
IN FLORIDA: 1-305-276-1500

**TranSec Systems, Inc.,** 220 Congress Park Drive, Delray Beach, FL 33445

Trademarks are the sole property of their respective owners. UNlock is for use only to improve the useability of legally acquired and operated software.


## ■ COMMUNICATIONS

macro from within *Alexander-Plus*.

The compiled macros are no longer readable or modifiable, allowing you to create macros for others knowing they won't be tampered with. This feature also provides a measure of security, since you can remove the source files from the disk. No one can read your compiled files to find out your passwords (although a sophisticated user could still turn local echo on in a parameter file, run the macro, and see the password typed to the screen).

*Alexander-Plus* provides a learn feature similar to the one on *BackComm* and the two versions of *Relay*. Here again, you can create simple macros on the fly by recording your keystrokes and the other system's responses. The recorded exchange can serve as a starting point for developing a more sophisticated script.

As with *BackComm*, *Alexander-Plus* makes an effort to provide immediate functionality for the nonprogrammer or the novice communications user. The install program asks for your user IDs and passwords for various systems, then inserts your answers into appropriate macros for using those systems. Once the macros are created, even a complete novice should be able to use the on-line systems by picking the right macros from a list.

As best as I can tell, the macros work as advertised, except that I couldn't test the macros for the Canadian services. Omzig provided three U.S. macros for me, but these were not set up automatically in the installation procedure.

Although you can use *Alexander-Plus* as a standard communications program, it really shines as a background e-mail system. The combination of macros and menu commands lets you list files to send and schedule the times to send them. Similarly, you can tell the program when to check your on-line mailboxes and download your mail. *Alexander-Plus* will handle all these tasks in the background, and it will maintain a list of files in your "in" basket and "out" basket, along with the status of each.

Very much on the plus side, *Alexander-Plus* has features that make it as much a telephone manager as it is a communications program. These features take advantage of the program's background mode, which makes it as convenient to use the

program to dial calls as it is to use your phone.

Most useful are note files that automatically attach themselves to your phone entries. They let you keep running track of phone conversations and retrieve your notes easily.

Also worth mentioning is the automatic phone log SMDR.DAT (for Station Message Detail Recording). You can use this to track all calls automatically, with date, time, duration, extension, number dialed, and last name of the person called. Omzig also sells a $99 program called *SMDA*, or *Station Message Detailed Accounting*. *SMDA* will generate reports from the SMDR.DAT file.

**GREAT PHONE DIRECTORY** *Alexander-Plus* also has one of the snazziest phone directories around. Each directory entry can hold up to four numbers, labeled as home, office, data, and telex. Each phone number can be entered as an actual number, the name of a macro, or a combination of both. One very nice touch is that you can designate the default number for each entry individually, so that one entry's default might be the work number while another entry's default might be the data number.

The number of phone entries is limited only by disk capacity. Each phone directory can hold a total of 100 entries, any or all of which can be names of another directory. Since phone directories are DOS files, you can create as many as you need.

If this package has any significant flaw, it is only that it tries too hard to hide the mechanics of communications. Omzig sees its average user as either someone in a large corporation who has had the program customized by a centralized DP department or someone who has bought the program from an on-line system and has similarly had the program customized. In either case, details are ignored on the ground that too much explanation may overwhelm the novice.

The manual suggests that you work through the skimpy Getting Started section, then jump into the program. That's bad advice. Getting Started doesn't even mention some of the most useful parts of the program, such as the note feature, and it barely hints at others, such as macros.


# Nobody ever thinks of PC AT batteries until it's too late.

Without a functioning battery, your computer is as good as dead. The battery in your PC AT or compatible controls your computer's configuration files, real time clock, and calendar. When the clock and calendar begin to fail, your battery's hours are numbered.

So be prepared. Get the best replacement battery you can buy. Get a TADIRAN battery from IBC—the high quality, high energy lithium battery that is already found in 80% of all PC AT's and compatibles as original equipment.

A unique **3 year warranty, 10 year shelf life**, and **UL approval** make a TADIRAN replacement battery the best insurance there is. So don't wait until your computer battery dies. Get a TADIRAN replacement battery from IBC today.

**ORDER NOW!**
**800/654-3790 (US)**
**800/225-9359 (CA)**
**Price only $27.50**

- **Dealer inquiries welcome.**
- **Corporate discounts available.**

For IBM PC AT, Compaq 286, and all other AT compatibles and clones. Checks, money orders, and credit cards welcome.

Add $3.00 for shipping and handling.

**IBC**
**International Battery Corporation**
6860 Canby Avenue, #113,
Reseda, CA 91335
818/609-0516, (TLX 6975427+)

IBM AT, and Compaq 286 are respective trademarks of IBM Corp. and Compaq Corp.

***Call for all Six-Pack replacement batteries.***

CIRCLE 269 ON READER SERVICE CARD

More important, the Getting Started section doesn't explain anything about communications. When I tried signing on to Tymnet the first time with this program, I got nothing but garbage. Thanks to previous experience with communications in general and Tymnet in particular, I immediately recognized the problem as a mismatch in communications parameters.

This sent me on a search for something labeled parameter file, communications parameters, or some such. I found Communications Profile and quickly changed the settings for data, stop bits, and parity. But if I hadn't known about such things before getting this program, I still wouldn't have known about them after reading the Getting Started section.

There is much about *Alexander-Plus* that is attractive and even innovative. Users may occasionally be frustrated by a design philosophy that hides information from them, but the toll-free technical-support number helps minimize the problem.

Ultimately, the attractiveness of the package depends on how Omzig implements the U.S. version of the macros and the installation procedure. If Omzig does the job well, the program will be attractive indeed, especially to novices. Even if *Alexander-Plus Data II* doesn't live up to its full promise, the underlying engine is intriguing enough to be worth a look.

## BackComm

*BackComm*, from LaSalle Micro, has much in common with *SideTalk*, but it offers far more functionality for the nonprogrammer or the novice communications user.

*BackComm*'s memory-resident, multitasking mode is essentially identical to *SideTalk*'s. Here, too, the multitasking applies to *BackComm* only when it's operating in the background. The one noteworthy difference is that *BackComm* lets you adjust the amount of time, or ticks of the computer clock, allotted to each task. As shipped, *BackComm* assigns five ticks to the foreground for each background tick. If either task fails to run smoothly, you can adjust the ratio one way or the other.

You can load *BackComm* without telling it whether you plan to use resident or nonresident mode. Instead, you make that decision when you leave the program. A normal exit, by way of the exit choice on the menu, removes *BackComm* from memory. A hot-key exit, using the Alt-Break combination, leaves *BackComm* in resident mode. You can also tell *BackComm* to load in resident mode and return you to the DOS prompt. This is useful for loading the program automatically from an AUTOEXEC.BAT file.

PMI INTRODUCES
PERFORMANCE PERIPHERALS
FAST286®
80286 COPROCESSOR
ONLY $295
10 DAY FREE TRIAL
LOTUS EMS COMPATIBLE
CONVERT YOUR PC-XT TO PC-AT POWER AND PERFORMANCE WITH 80286 COPROCESSING
• 8MHz Operation
• BUS Independent Operation
• Switch Selectable Mode Between 8086 & 80286
• 8KB of Zero-Wait-State Memory
• Compatible with 8MHz Motherboards
• One Year Warranty
FASTCARD® with 2 MBYTES
THE ONLY EXPANDED MEMORY CARD WHICH CAN SAVE A DAY EACH WEEK.
10 DAY FREE TRIAL
LOTUS EMS COMPATIBLE
ONLY $295
A major independent testing laboratory benchmarked a PC-XT equipped with FASTCARD and demonstrated a tenfold improvement over a PC-AT on typical Disk I/O operations.
• 3 MHz Operation
• 2MB of Factory Installed & Tested DRAMs
• Split Memory Fills to 640K, Provides Expanded Memory Over 640K
• Custom Password Security
• Disk Caching & Print Buffering Software
• Serial, Parallel & Game Ports
• Clock Calendar
• One Year Warranty
BUY BOTH AND SAVE
Order FAST286 with FASTCARD for ONLY $495!
DEALER INQUIRIES WELCOME FOR ADDITIONAL INFORMATION CONTACT:
PMI PERIPHERAL MARKETING, INC. (602) 483-7983
7825 E. EVANS RD., BLDG. 500, SCOTTSDALE, ARIZONA 85260
CIRCLE 532 ON READER SERVICE CARD

One of *BackComm*'s advantages is that you can unload it from memory without having to reboot your system. The first time you use the Alt-Break combination, *BackComm* becomes resident. After that, if you try using the exit choice on the main menu, you'll get a warning. The program reminds you that it is resident and that you should remove any programs loaded after *BackComm*. It then gives you the choice of exiting or not. In fairness, this is more important with *BackComm*, which uses 180K bytes of RAM, than it is with *SideTalk*, which defaults to half as much.

Another plus is the way *BackComm* handles a system with two monitors. As with *SideTalk*, *BackComm* can run on one monitor while another program runs on the other. Unlike *SideTalk*, *BackComm* can run on both color and monochrome monitors.

There is nothing snazzy here, like mouse support or pop-up and pull-down menus, but the menu system is straightforward and intuitive. And for advanced users, who may tire of the nested menus, *BackComm* offers an alternative command mode.

*BackComm* did slightly better than *SideTalk* on the compatibility tests, but not well enough to make me feel complacent about using it. It has much the same problem with *Microsoft Word* that *SideTalk* has. Typing the hotkey sequence from within *Word* takes the keyboard away from *Word*, but does nothing for the screen except mess it up. Typing the sequence a second time leaves the screen jumbled but reactivates the keyboard. Having performed this magic on the screen, the system becomes unpredictable. Once it crashed when I tried to leave *Word*. Another time it let me leave the program but crashed when I tried to load it again.

Oddly, I managed to make *BackComm* work with *Word* by loading both *ProKey* and *SideKick* before loading *BackComm*.

PC MAGAZINE FACT FILE

***BackComm***
LaSalle Micro Inc
1254 Devonshire Rd
Buffalo Grove, IL 60089
(312) 634-2288
**List Price:** $149
**Requires:** 256K RAM (320K recommended), DOS 2.1 or later.
**In Short:** *BackComm*'s ability to generate script files for commonly used information services makes scripts accessible to new users, but the package is marred by an almost useless manual. Not copy protected.

CIRCLE 453 ON READER SERVICE CARD

**Get the smart battery backup from Perma Power**

*Brainy Standby Power System guards your computer... when the power goes off, and when it comes back on!*

Here's the first Standby Battery Backup System that never lets dangerous power line voltage through to your computer. A unique sensor system delays start-up or restart until the power line is absolutely safe. The SPS-500 protects from high line voltages, brownouts, momentary dropouts, spikes and surges, RFI/EMI "noise" as well as loss of power. The smart circuit also senses and warns of overload and surge suppressor or battery failure.

All this protection is completely automatic, maintenance-free, and very fast (¾ millisecond transfer and 3½ hour maximum recharge). Since this is a Standby Power System, it costs less, is more efficient, smaller, quieter and cooler operating than Uninterruptible Power Systems. And this brain-powered battery backup is only $799 manufacturer's suggested list price... complete with 2-year warranty.

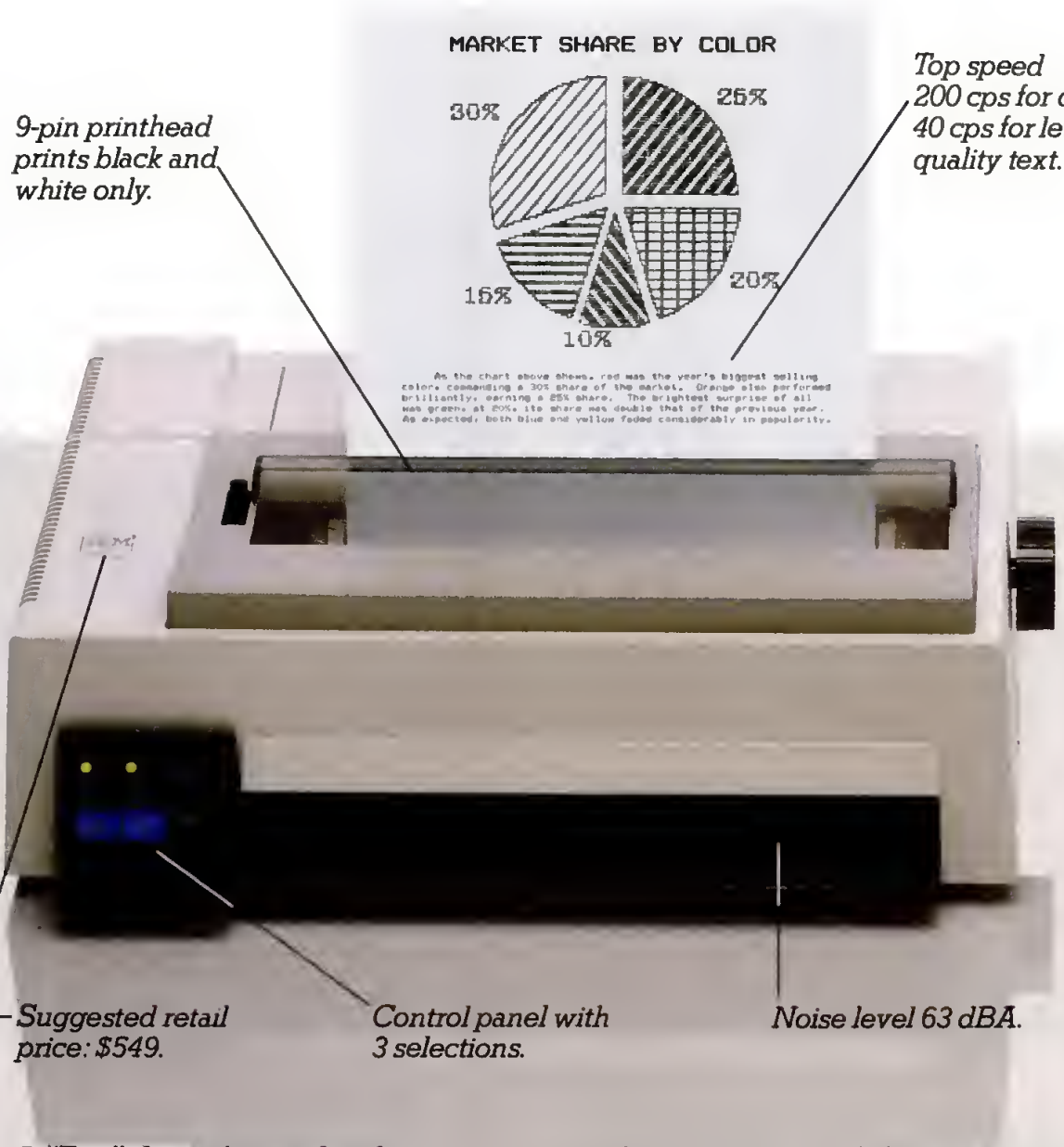
Perma Power has U.S.-made products for all your PC or mini-computer power protection requirements—Surge Suppressors, Telephone Line Surge Suppressors, Power Commanders®, and Power Conditioners. Available nationwide from computer, electronics and office supply dealers.

Perma Power®
Electronics, Inc
5601 West Howard Avenue
Chicago, Illinois 60648
Telephone (312) 647-9414
Telex 4948559 PRMPWR

PERMA POWER

CIRCLE 161 ON READER SERVICE CARD

# HOW TO B




A "Pro" doesn't stand a chance next to the new ALPS ALQ200™.

Because the ALQ200 has more of what it takes to get more done.

Take speed, for instance. With its 18- or 24-pin printhead, the ALQ200 prints excellent letter quality text twice as fast.

And the same is true for high resolution graphics. Where, as you can see, we also have a distinct color advantage.

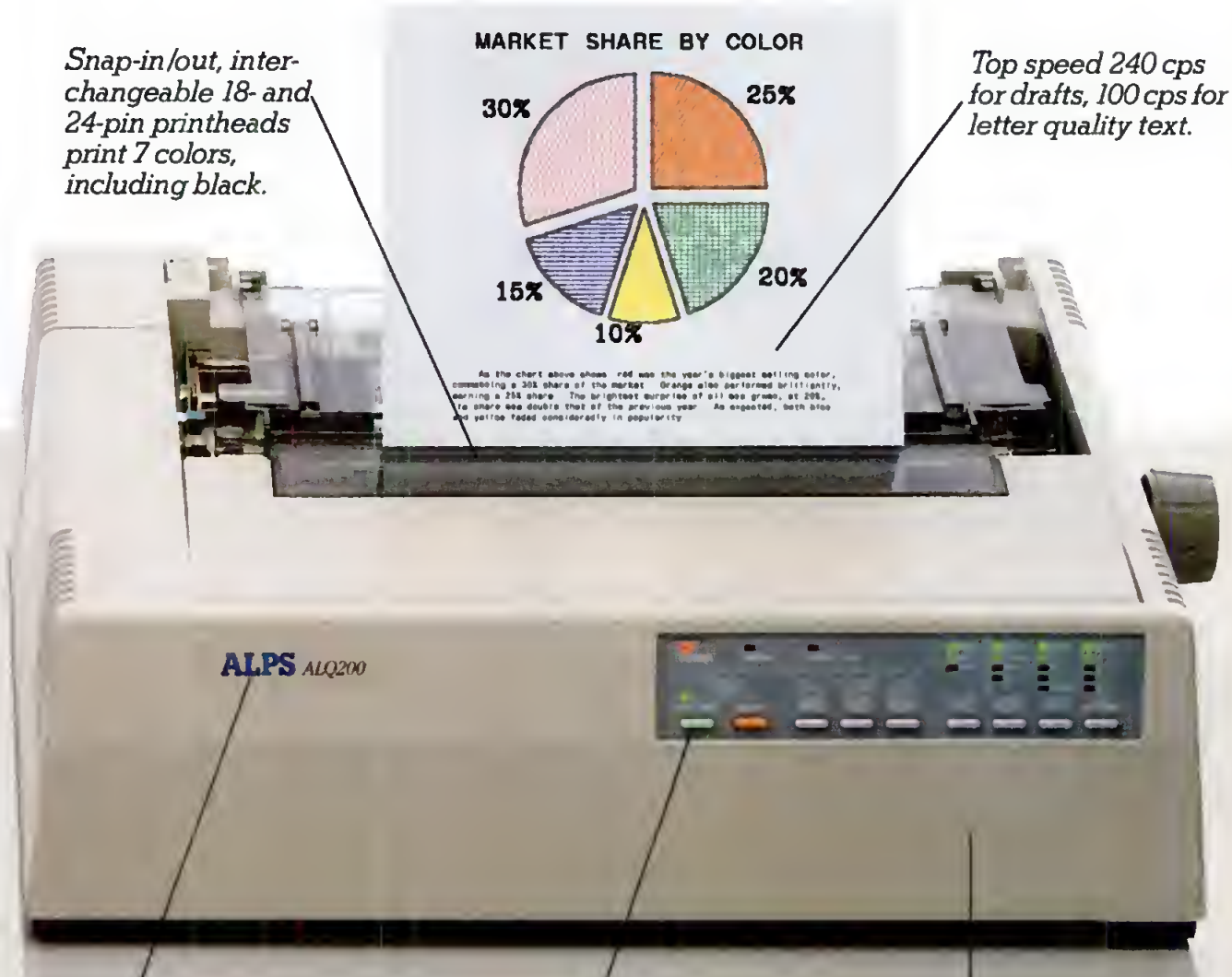
The ALQ200 even has what it takes to make people faster. Like automatic paper loading. A full-function, push-button control panel. And compatibility with all the leading PCs and software.

Specifications and prices based on respective manufacturer's published literature. Subject to change without notice.

# EAT A PRO.

*Snap-in/out, interchangeable 18- and 24-pin printheads print 7 colors, including black.*

*Top speed 240 cps for drafts, 100 cps for letter quality text.*




*Suggested retail price: $595 for 18-pin, $695 for 24-pin.*

*Push-button panel controls all printing functions without DIP switches or software commands.*

*Noise level 55 dBA.*

You'll also find the ALQ200 especially compatible with busy offices. After all, it's about as solidly built as a printer can be. So it's quieter. And nearly impossible to overwork.

But what really beats all is that the ALQ200 costs about the same as the so-called "Pro."

For a free demonstration or more information, call us at **(800) 828-ALPS.** In California, (800) 257-7872.

And see a real pro at work.

**ALPS**
*AMERICA*

**IT'S TIME YOU SAW THE ALPS.**

CIRCLE 242 ON READER SERVICE CARD

ALQ200 is a trademark of ALPS Electric Co., Ltd. ©1987 ALPS America

With this combination in place, the hot key brings *BackComm* to the screen, and the program works without problems. Going back into *Word* destroys the *Word* screen, but you can recover from this easily enough by using the Library Run command to have *Word* reset the graphics mode. Also noteworthy is that there were no more system crashes with *ProKey* and *SideKick* loaded.

**USING THE PROGRAM** *BackComm*'s command language, BackTalk, is patterned after BASIC and is very much in the same class as the *SideTalk* command language. More important, *BackComm* is designed to let you take advantage of its language with minimum effort.

The program can automatically generate simple command sequences by recording your keystrokes and the response from the other system. You only have to tell *BackComm* when to start learning a procedure and when to stop. The resulting script file will lack flow and error control commands, but it will serve as a starting point for developing a more sophisticated script.

Far more impressive is an option on the main menu called Setup Info Services. Choose this, and *BackComm* lists nine widely used systems—CompuServe, Delphi, Dialog, Dow Jones News/Retrieval, EasyLink, MCI Mail, NewsNet, OAG, and The Source. Pick the services you're signed up with and give *BackComm* the phone number, your user name, and your password, and the program will write a series of script files for you. *BackComm* even asks whether you're calling through a network, and if so, which one. The program will write the appropriate script for the network.

Unlike the simple scripts generated by the learn feature, these scripts include error checking and flow control, and will automate most of your communications tasks.

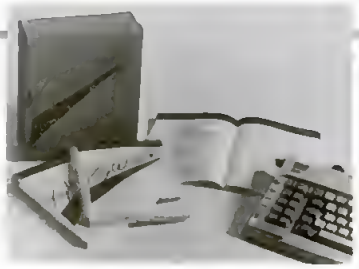
Even if you don't use any of the services that *BackComm* generates scripts for, you will still find these scripts valuable guides for creating your own. You may even be able to use them with relatively minor changes. Another potentially useful feature is a bulletin board system written as a *BackTalk* script file.

A nice touch is *BackComm*'s menu-based phone schedule option. As the name suggests, this feature lets you list phone calls to be made and the times to make them. The program also offers an impressive list of menu-customizable features—from screen colors to status line to passwords.

Very much on the minus side is a manual that is at least one major revision behind the program and is often wrong in its particulars. The less comfortable you are with communications, the more likely you


WHAT YOU GET IS THREE TIMES BETTER THAN WHAT YOU SEE.

3



*Don't try to choose between word processing, desktop publishing, and typesetting. One software package does it all: XyWrite III.*

*XyWrite III is a high-performance word processor.*

*XyWrite III is ideal for writers, editors, lawyers, and other people who process large volumes of text. It's fast, flexible, and full of advanced features.*

*XyWrite III drives a laser printer for desktop publishing.*

*XyWrite III lets you take advantage of all the capabilities of today's sophisticated laser printers. Use different fonts, proportional spacing, and all the other special features your printer has to produce high-quality output right from your PC.*

*XyWrite III prepares your text for typesetting.*

*Type your text as you'd like it to appear and let XyWrite III's commands take the place of visible typesetting codes. Hand it right over to your typographer —there's no need for separate formatting instructions or retyping. You get more control, and fewer errors.*

***Call (617)275-4439 and order XyWrite III ($395), or the demo disk ($7).***

XYQUEST

*XyQuest, Inc.*
*3 Loomis Street, Bedford, MA 01730*

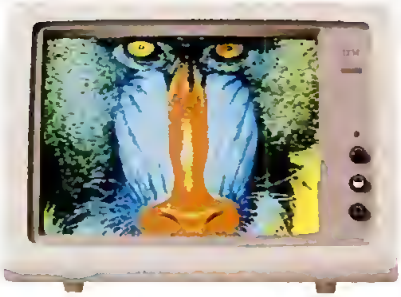
CIRCLE 518 ON READER SERVICE CARD

# EGAWONDER™

# Any Software. Any Monitor. Any Time.

Any Software on an EGA Monitor

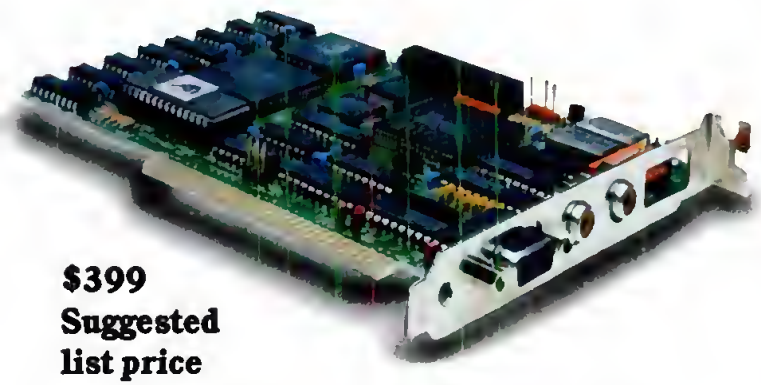
Any Software on a TTL Monochrome Monitor



Any Software on an RGB Color Monitor[1]

**Upgrade to EGA without an EGA Monitor**
The unique ATI EGA WONDER allows upgrade to the new EGA graphics standard without the purchase of an expensive EGA monitor. EGA WONDER runs EGA, CGA, MDA, Hercules and 132 column software on EGA Color, RGB Color, TTL Monochrome and Composite monitors. Extremely flexible, EGA WONDER maintains downward compatibility to both existing software and existing monitors. On the internal monitor of a Compaq PC Portable, EGA WONDER displays EGA, CGA, MDA and Hercules software via an optional expansion module.[2] For EGA monitor users, the ATI EGA WONDER improves the display of CGA software by producing high resolution 8×14 text and double scanned graphics. Old CGA software is now displayed with EGA quality. Completely compatible to IBM's EGA, ATI's EGA WONDER performs smooth scrolling, pixel panning and windowing. No memory modules are required because 256K of video memory is a standard feature. EGA WONDER is the only card able to display EGA software on the internal monitor of both the IBM PC Portable and the Compaq PC Portable. EGA WONDER provides an NTSC Composite signal for interface to a Polaroid Palette.

**SoftSense Automatic Mode Switching**
User friendly and easy to use, the ATI EGA WONDER has built-in SoftSense Automatic Mode Switching. It is actually able to sense and automatically switch between EGA and CGA color modes or between EGA, MDA and Hercules monochrome modes. The ATI EGA WONDER is compatible at the hardware level to the IBM Enhanced Graphics Adapter, the IBM Color/Graphics Adapter, the IBM Monochrome Display Adapter and the Hercules Graphics Card to minimize software incompatibilities.



**$399 Suggested list price**

EGA WONDER is now available from all major computer stores, call us today at (416) 477-8804 for more information.

ATI® TECHNOLOGIES INC

*Technology you can Trust.*

ATI Technologies Inc., 450 Esna Park Dr., Markham, Ontario, Canada L3R 1H5. TLX. 06-966640.

Trademarks IBM PC Portable - EGA CGA MDA - International Business Machines - Compaq - Compaq Computer Corporation - Hercules - Hercules Computer Technology Polaroid Palette - Polaroid Corporation Graphics courtesy Rix Softworks Inc

1. Any Software Any Monitor, Any Time applies to IBM graphics, standards, monitors, software
2. Optional Compaq Expansion Module, (available for internal portable dual mode monitor no 132 Columns) Suggested list price $99
3. EGA MDA Hercules software displayed via interlacing Flickering effect of interlacing reduced with purchase of anti glare screen filter

CIRCLE 540 ON READER SERVICE CARD

# How to keep track of absolutely everything* for $99.95

*"Where's that piece of paper with his phone number?"*
*"You need the key prospect report in 30 MINUTES?!"*
*"Why am I just finding out we're two weeks behind schedule?"*
*"What did we agree to last time we talked?"*
*"What magazine had that article we need?"*

Only one PC software can answer all of these questions quickly and easily—the DayFlo TRACKER, the first Information Tracking System (ITS) for IBM PC/XT/AT® and compatibles. Now, at a special introductory price!

The DayFlo TRACKER keeps track of all the information you need daily—prospects, clients, projects, schedules, reference books, meeting notes, magazine articles, followups—that no other software can handle. A database can't do it. It's too structured. A word processor can't do it. It's not structured enough. TRACKER combines the best of both to perform a whole new task—tracking.

Get started immediately with the 50+ standard forms and report formats provided in TRACKER and the handy Application Pack—using simple menus. Customizing forms is easy too. And recalling records is done naturally using your own combination of key words. No more lost data! Then use the report writer to print out letters, labels, lists, etc. It's hard to believe so much sophisticated technology can be so easy to use—and so inexpensive. Order now at the special introductory price or call DayFlo for more information at (800) 367-5369. In California (714) 474-2901.

DAYFLO Software™
TRACKER

DayFlo Software
17701 Mitchell Avenue North
Irvine, CA 92714

*Except your car keys.

SPECIAL INTRODUCTORY OFFER
*First 2500 orders only*
*DayFlo TRACKER plus Application Pack*
*($189.90 value) $99.95*

☐ Enclosed is my check/money order payable to: DayFlo Software
☐ Please charge my: ☐ Mastercard ☐ Visa

Card No. _____ Exp. Date _____
Signature (Charges Only) _____
Name _____
Address _____
City _____ State _____ Zip _____
Telephone _____

Shipping and Handling: $_____
(U.S., Canada & Mexico $5.00 Elsewhere $15.00)
California residents add 6%. $_____
Total: $_____

Mail to: DayFlo Software, 17701 Mitchell Avenue North, Irvine, CA 92714.
Sales/Order Information: 1-800-367-5369. In California: 1-714-474-2901.
Not copy protected, 30-day money-back guarantee.

Requires DOS, 384K RAM and hard disk on IBM PC or compatible.
IBM PC/XT/AT are registered trademarks of International Business Machines Corporation.

CIRCLE 338 ON READER SERVICE CARD




are to be hopelessly confused. No matter what your level of sophistication, you're probably best off ignoring the manual completely and relying on the program's context-sensitive help feature.

Despite the manual, this program will help you make the most of its background communications feature with minimum effort. And there's enough here to make *BackComm* hard to outgrow.

## Relay Gold Relay Silver

*Relay Gold* and *Relay Silver*, from VM Personal Computing, are second-generation programs, descendants of the original *Relay*, a full-featured program with the ability to interface with VM's mainframe communications software. These programs have been molded into their current form by a long history of user feedback, and it's no surprise that they have a much more finished feel than either *SideTalk* or *BackComm*. *Relay Silver* is actually a subset of *Relay Gold*. The difference between the two is that *Relay Gold* will communicate with VM's mainframe packages while *Relay Silver* will not. Also, *Relay Silver* is $100 cheaper than *Relay Gold*. Unless otherwise noted, all comments about *Relay Gold* also apply to *Relay Silver*.

*Relay*'s memory-resident, multitasking mode is no different from *SideTalk*'s or *BackComm*'s. Here again, the multitasking applies only when it's operating in the background. As with *BackComm*, *Relay Gold* lets you adjust the time allotted for the background task, with a range of 10 to 50 percent.

*Relay* was originally designed as a standalone program, and *Relay Gold* will load in its standalone mode unless you tell it otherwise. If you want it to run in resident mode, you have to add a command line switch when you start the program.

As with *BackComm*, you can remove *Relay Gold* from memory without having to reboot your system. The process is similar to removing *BackComm* from memory, but it's slicker. *BackComm* will remind you to remove other programs from memory and then let you exit, leaving it up to you to decide whether it's safe or not.

*Relay Gold* will similarly remind you to

remove other programs, but it also will refuse to unload from memory until you remove them. As with *BackComm*, the ability to unload the program is an important feature, since *Relay Gold* takes up about 197K bytes of RAM.

**PEACEFUL CO-EXISTENCE** *Relay Gold* was unquestionably the winner in the compatibility tests. I ran into one minor problem: *SideKick* wouldn't always come up when it was told to. But this was a problem only if *Relay Gold* was loaded first. What's more, VM technical support provided a simple patch to *SideKick* that solved the problem. (According to a VM spokesman, Borland can provide the patch as well.)

I also ran into one compatibility problem that VM had already found and fixed, but not before shipping my early copy of *Relay Gold*. The cure for this problem was almost painless, however. I only had to call the company's bulletin board system and download a series of what it calls "zap files," or patches.

Along with the zap files, the bulletin board sends a BASIC program that automatically applies the patches to your copy of the program. The entire process is menu driven and requires no technical competence whatsoever.

The updated version of the program worked almost flawlessly in the compatibility tests. *Relay Gold* even handles *Word*'s graphics mode without a serious problem. When *Relay Gold* is called from the *Word* screen, it gives a "Warning, Unable to Save Program Display" message. When you go back to *Word*, the screen is slightly garbled, as expected. But it recovers easily when you use the Library Run command to let *Word* reset the screen.

*Relay Gold*'s command language is among the most sophisticated of any com-

EDITOR'S CHOICE

PC MAGAZINE FACT FILE

***Relay Gold*, Version 2.0**
***Relay Silver*, Version 1.0**
VM Personal Computing Inc.
41 Kenosia Ave.
Danbury, CT 06810
(203) 798-3800

**List Price:** *Relay Gold*, $250; *Relay Silver*, $150.
**Requires:** 256K RAM, DOS 2.0 or later.
**In Short:** *Relay Gold* and *Relay Silver* are second-generation programs, descendants of the original *Relay*, and the heritage shows. They co-exist remarkably well with other programs and they offer a sophisticated command language. Not copy protected.

CIRCLE 452 ON READER SERVICE CARD

munications program. As with *SideTalk* and *BackComm*, it's flexible enough to create a bulletin board system, and as with *BackComm*, the bulletin board script file comes with the program. But while the power is there for those who can use it, the program is also designed so as not to overwhelm the communications newcomer.

*Relay Gold*'s learn feature will automatically generate simple command sequences by recording both your keystrokes and the response from the other system. As with *BackComm*, the resulting script file will be lacking in flow control and error control commands, but it will serve as a useful starting point. Once recorded, you can edit the script using *Relay Gold*'s built-in editor or another text editor.

Missing from *Relay Gold* is anything even vaguely similar to *BackComm*'s "Setup Info Services." If you want to generate complex scripts, you'll pretty much have to do it yourself. Or if you're setting up communications for corporate-wide use, you could create your own script-generating master.

*Relay Gold*'s manual is superior by any standard. Its 46 pages of heavily-commented sample scripts are almost as useful as *BackComm*'s self-generating scripts.

*Relay Gold*'s menu system is at least as good as *BackComm*'s, and the Getting Started manual will get you up and running with minimum effort. As with *BackComm*, there is much here for both the beginner and the experienced user. As general-purpose communications programs, *Relay Gold* and *Relay Silver* are among the best. The resident, multitasking mode simply makes them better.

## SideTalk

*SideTalk*, from Lattice, is billed as a memory-resident package "that puts your modem a keystroke away." It actually does far more than that.

Unless told otherwise, *SideTalk* loads in its resident mode. It puts its copyright notice on the screen, reminds you to press Shift-Alt to activate, and then returns you to the DOS prompt. This makes it easy to load *SideTalk* automatically as part of an AUTOEXEC.BAT file. Once loaded, you can "hot key" into *SideTalk* immediately or ignore the program until you need it. Alternatively, a simple command-line "switch" when loading *SideTalk* will tell the program to load in its nonresident mode or load in resident mode and activate without waiting for the hot key.

*SideTalk*'s multitasking applies only to *SideTalk* itself. If you are in the middle of a database sort, for example, and you go into *SideTalk*, the sort operation will stop, and


Support your clients without leaving your office!

**With pcAnywhere software.**
It lets you access and run an unattended IBM PC, XT, AT or compatible from any remote location. On any personal computer. Day or night.

This makes it ideally suited to remote customer service and technical support. Because you can identify and solve problems from your office PC! Saving valuable time and the expense of a field service call.

With pcAnywhere you can transfer a file from your client's PC to yours, fix it, then transfer the file back to the client.

Virtually any program on the client's PC can be controlled from your keyboard. As though you were sitting in front of the client's computer. Take remote control, then give it back to your client's PC. Or keep both keyboards active at the same time and type messages back and forth.

pcAnywhere is simply the best and most inexpensive way there is for you to service a client.

**TeleSwitch is the perfect companion!**
It lets you power up or power down a PC and its peripherals from a remote location. Day or night.

Call the distributor nearest you for more information or to place an order. You'll find yourself in remote control before you know it!

**Call the distributor nearest you:**

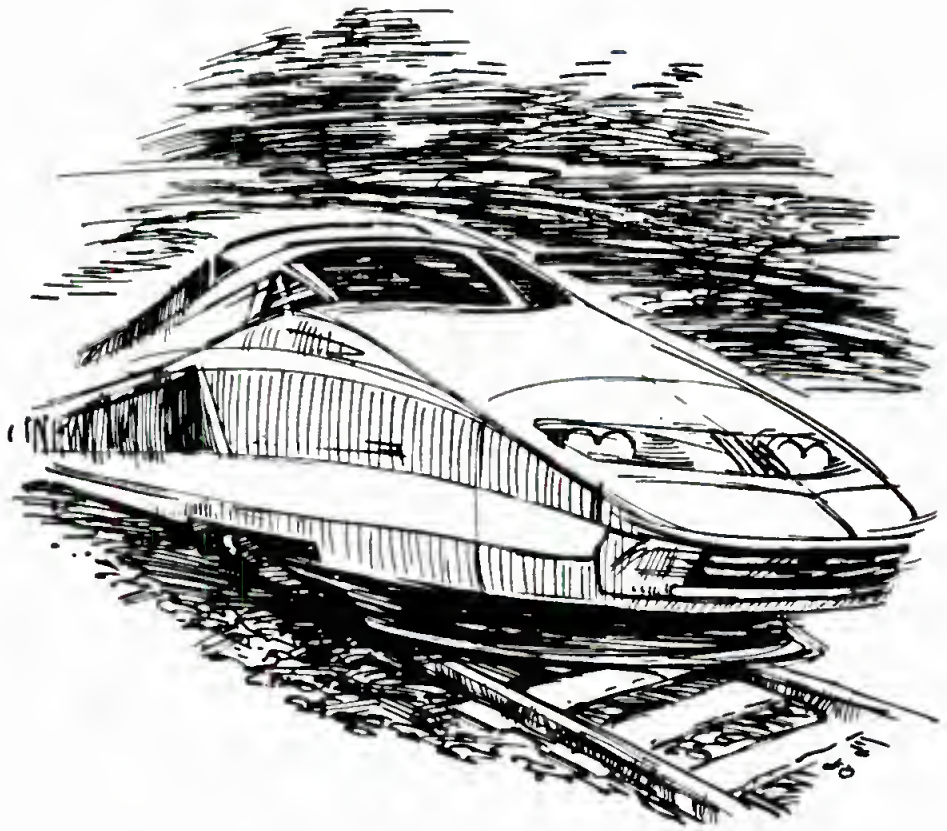
Network Compatibility Group - Columbus, OH • 614-436-2962
Professional Data Management - Scottsdale, AZ • 602-949-7366
ADS Associe's LTEE - Quebec, Canada • 418-648-0858
Synergy Corporation - Dallas, TX • 214-987-9602
Omni Data/Cyber Systems - Manchester, NH • 603-645-6612
Dataway - Grapeview, WA • 206-786-5363 (24 hr line) 206-275-4146 (Data Line)

Additional distributor inquiries are welcome.

EKD

764 Middle Country Road, Selden, N.Y. 11784 (516) 736-2111

CIRCLE 173 ON READER SERVICE CARD



# How a French train inspired the fastest 286 micro you can buy.

**Not just any French train, but "La Grande Vitesse"—"The High Speed."** It's the fastest train in the world, routinely eating up steel track at speeds normally associated with small aircraft.

It was during such a screaming ride that we christened our new, high-speed micro . . . a superfast 12MHz 80286 microprocessor operating at Zero Wait State.

*"Grande Vitesse" means high speed—in this case, 12Mhz with no wait states*

We call this remarkable compatible the "GV" 286, and it's the very first 12MHz No-Wait-State micro available outside a research laboratory.

To design a machine that operates reliably at 12MHz with no wait states, our engineers had to come up with some major innovations. And they did.

## A power user's dream

The GV-286 is the first 80286 micro to include a high-speed RAM cache circuit, making data retrieval from the processor almost instantaneous. It's the same design feature that makes our new GV-386 the fastest machine in that rarified category.

The cache circuit also assures high reliability, allowing the GV-286 to operate at super-high speeds without pushing its integrated circuits beyond their design limits. Other 12MHz machines put their ICs through hell to achieve high speed, and that means they're inherently less reliable.

Yet with all this speed and design innovation, PC Designs engineers—unlike other manufacturers—have customized the BIOS and retained the standard IBM PC-AT bus timing (yet another PC Designs exclusive). The result is unparalleled compatibility with existing software and peripherals.

There's a boxcar load of other design features and the GV-286 can be ordered up in virtually any configuration you can imagine. Best of all, standard systems start at less than $4000 (including Desqview multitasking software).

## Enter the No-Wait-State

If you've been holding out for a 80286 micro with the speed of a bullet train and the reliability of the family station wagon, your wait state is over.

**PC Designs**

## Call us now in New York: 1-212-514-7280 or in Tulsa: 1-918-251-5550

**2500 N. Hemlock Circle, Broken Arrow, OK 74012 • 19 Rector St., Suite 2705, New York, NY 10006**

CIRCLE 372 ON READER SERVICE CARD

it will remain stopped until you leave *SideTalk*. On the other hand, if you have a file transfer started in *SideTalk*, you can hotkey back to your database program, and the file transfer will continue.

This asymmetric arrangement for multitasking is less than ideal. Given a choice, you might like to continue a database sort in the background while you manually handle a communications session. Still, it's a far better use of computer time than having no multitasking at all, and given the limitations of DOS, it may be the best available solution.

**THE BATTLE FOR CONTROL** Of course, the critical test for a memory-resident program is how well it gets along with other programs. The manual claims *SideTalk* coexists well with other memory-resident programs but also warns that *SideTalk* must be the first program loaded.

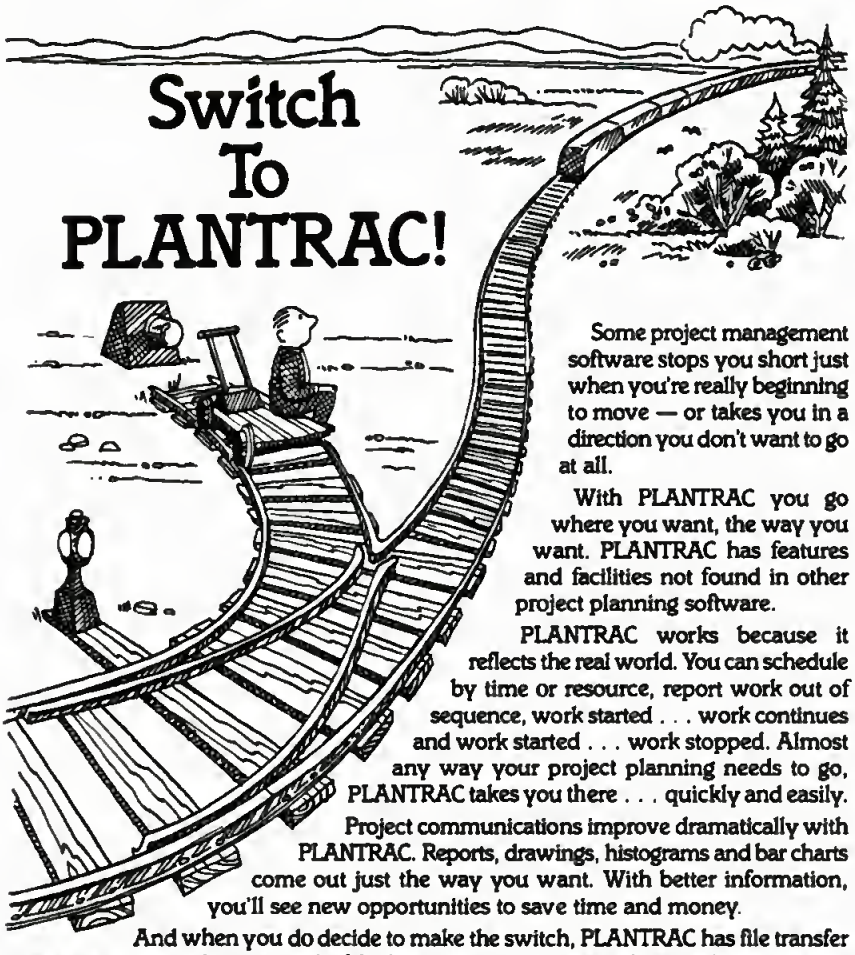
To test compatibility, I tried *SideTalk* along with various combinations of *SideKick*, *ProKey*, *SuperCalc4*, *1-2-3* (Releases 1A and 2), *WordStar*, *WordPerfect*, and *Microsoft Word*, all running under DOS 3.1. In all cases I used a 6-MHz AT equipped with both an EGA/ECD combination and a monochrome monitor.

In most of the tests, *SideTalk* worked as advertised, going about its business in the background without disturbing the program in the foreground. However, there are three important exceptions.

*SideTalk* has a problem with *1-2-3*, Release 1A, at least when *ProKey* is also loaded. Every time I tried this combination, the system died on me, usually forcing me to reboot. I had no problems with Release 1A by itself or in combination with *SideKick*. Interestingly, *SideTalk* does not have a problem with *ProKey* and *1-2-3*, Release 2, loaded together.

A more serious problem is with *Micro-*


Sidelined By Your Current Project Management Software?




Some project management software stops you short just when you're really beginning to move — or takes you in a direction you don't want to go at all.

With PLANTRAC you go where you want, the way you want. PLANTRAC has features and facilities not found in other project planning software.

PLANTRAC works because it reflects the real world. You can schedule by time or resource, report work out of sequence, work started . . . work continues and work started . . . work stopped. Almost any way your project planning needs to go, PLANTRAC takes you there . . . quickly and easily.

Project communications improve dramatically with PLANTRAC. Reports, drawings, histograms and bar charts come out just the way you want. With better information, you'll see new opportunities to save time and money.

And when you do decide to make the switch, PLANTRAC has file transfer programs to insure that your valuable data retains its integrity, along with training and support services designed to smooth your journey . . . So do like thousands of project planners around the world and switch to PLANTRAC, now!

For an evaluation package or free demonstration diskette, write: PLANTRAC, P.O. Box 308, 52 School St., Pembroke, MA 02359.

or call:
617-294-1111
(Telex: 247316)

PLANTRAC is a product of Computerline.
PLANTRAC

PLANTRAC runs on the IBM PC/XT/AT and most MSDOS systems Hard disk required
IBM is a trademark of International Business Machines, MSDOS is a trademark of Microsoft Corporation, PLANTRAC is a trademark of Computerline, Inc

CIRCLE 362 ON READER SERVICE CARD


PC MAGAZINE FACT FILE

***SideTalk*, Version 1.00**
Lattice Inc.
P.O. Box 3072
Glen Ellyn, IL 60138
(800) 533-3577
(312) 858-7950 (in Ill.)
**List Price:** $119.95
**Requires:** 128K RAM for standalone mode (256K recommended for resident mode), Hayes-compatible modem.
**In Short:** Aimed primarily at programmers and VARs, *SideTalk* offers the potential of building your own program, but it may be overwhelming to less-sophisticated users. Not copy protected.

CIRCLE 454 ON READER SERVICE CARD

*soft Word*, by itself or in combination with other memory-resident programs. After loading *Word* in its graphics mode, you cannot hot key into *SideTalk*. Hitting the Alt-Shift combination brings the *SideTalk* status line into view, but the rest of the screen remains unchanged. The keyboard at that point goes dead, with no effect for *Word* or *SideTalk*. Another Alt-Shift wakes the keyboard up again, for *Word*.

After quitting *Word*, the hot key works, but the *SideTalk* screen comes up as a mess, presumably because of the shift from graphics mode to text mode. *SideTalk* works at that point, and the screen recovers as text scrolls up and the screen is rewritten. Unfortunately, this is not just a cosmetic problem. Hitting the Alt-Shift several times from within *Word* is likely to crash the system.

The third problem is the least serious since it grows out of a feature you can easily ignore. If you have both a color and monochrome monitor, *SideTalk* can be set to take over the color screen and let you run other programs on the monochrome screen. This lets you keep tabs on the status of background communications simply by glancing at the color screen.

While this is a nice idea, it doesn't always work. With some combinations of *SuperCalc4* and other programs, the EGA screen occasionally blanked out, collapsing to one line and forcing me to reboot. The problem showed up only when I had *SideTalk* set for both monitors.

Even without this problem, the two-screen feature is not as useful as it might be. In most cases I'd rather have *SideTalk* take over the monochrome screen and leave the EGA free for the foreground program. A Lattice spokesman says future releases may provide the option of running *SideTalk* on either of two monitors.

All told, *SideTalk* gets along with other programs well, but it still leaves me wishing for a hardware reset button on my AT. And I'd be cautious about using *SideTalk* along with other memory-resident programs. I'm also uncomfortable because there is no easy way to remove *SideTalk* from memory short of rebooting your system. A Lattice spokesman points out that *SideTalk* is compatible with *Referee*, which can handle the task. But I'd rather have the feature built into *SideTalk*.

**COMMAND LANGUAGE** If memory-resident communications were *SideTalk*'s only significant feature, it would be a useful but limited communications program. But the program also has a sophisticated script language, complete with commands for file control, error handling, string handling, flow control, and arithmetic.

If you have the time and inclination, you can create scripts that will handle vir-


**500,000 people love . . .**

**PC-File + ™**

**The Most Popular Database in the World**

- Paint Entry Screens
- Prepare Sophisticated Reports
- Mail Merge Form Letters
- Perform Advanced Calculations
- Lookup in Multiple Databases

**SPECIAL OFFER!**

**BUY PC-FILE + BEFORE JUNE 30,**

**RECEIVE PC-STYLE™**

*(THE PROGRAM THAT HELPS YOU WRITE BETTER)*

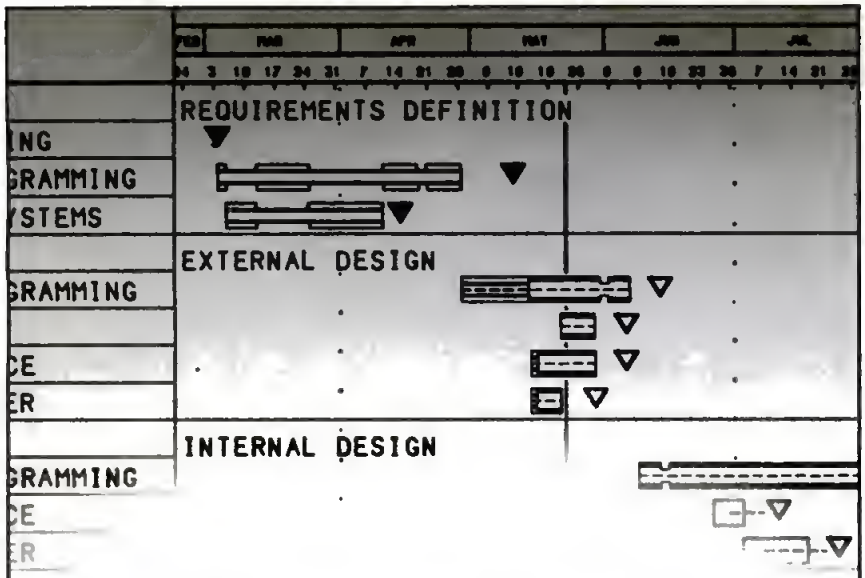
**FOR FREE!**

*Note: Mention or include this coupon with your order*
*Offer Ends June 30, 1987*

**Price: $69.95 plus $5 s/h**

**ButtonWare, PO Box 5786, Bellevue, WA 98006 1-800-JBUTTON**

CIRCLE 312 ON READER SERVICE CARD




# Save yourself a thousand words.

To a project manager, nothing's more important than good communications.

That's why we created Primavision™ as the graphics complement to Primavera Project Planner,® Finest Hour™ and Microsoft® Project 3.0. Primavision lets you present your project with crisp, clear, boardroom-quality graphics —i-j networks, bar charts and time-scaled precedence logic diagrams.

**Summarize an entire project on a single page**

Take our summary bar chart above. Multiple activities are consolidated into a single bar for each manager, while bars are grouped by phase. Completed, underway and critical activities are highlighted; progress is shown thermometer style.

Start and finish dates (early and late) are summarized for all activities included in each bar. Work and non-work intervals of the component activities are differentiated by the width of the bar. Target dates are flagged as triangles.

And that's only one sample of what Primavision can provide. Just decide what you want to show and how you want to show it. Primavision does the rest, picture perfect.

For more information or the name of a dealer in your area, contact Primavera today.

Primavision. It can save you a dozen questions... and a thousand words.

**Project management software that works as hard as you do.**

**PRIMAVERA SYSTEMS, INC.**

Two Bala Plaza • Bala Cynwyd, PA 19004 • (215) 667-8600 • Telex: 910 997 0484

Primavera project management software is available for MS-DOS and VAX environments.

CIRCLE 187 ON READER SERVICE CARD

## ■ COMMUNICATIONS

tually any communications task you can think of—and quite a bit more. You can best get a sense of the possibilities of the *SideTalk* script language by looking at *SideTalk* itself.

As shipped, the program includes a set of pop-up menus with choices for help, phone directory, communications settings, and so on. These menus were all created with *SideTalk* command files. All of them can be changed at will or completely ignored. And since the help files are simple text files, you can change these as well or write more of them to explain any new command files you write.

The underlying *SideTalk* program is fully command-based, and it can function just fine without the menus—if you know the commands.

It may be most appropriate to think of *SideTalk* as a communications-oriented programming language, in much the same sense that *dBASE* is a database-oriented programming language.

The *SideTalk* language is complex and can be daunting to those without programming and/or communications experience. The BASIC-like programming commands include commands for file control, error handling, and the like. The communications commands include parameter settings (bit-per-second, COM port, and modem settings), file transfer commands, file maintenance commands, and remote session commands.

The manual wisely suggests that since the 95 commands may seem overwhelming, you should familiarize yourself with small groups of them before tackling the whole language.

Most of the communications commands are straightforward—SA for send a file in ASCII format, SX for send a file in Xmodem format, and so forth. If you are familiar with communications, this should be enough. If not, expect to spend some time flipping between the command list, your modem manual, and the alphabetized explanation of commands in the reference section of the manual.

There is no question that the *SideTalk* command language will let you write complex scripts. Lattice has even written a bulletin board script for *SideTalk* and will supply you with the most up-to-date version. A more typical script might activate the

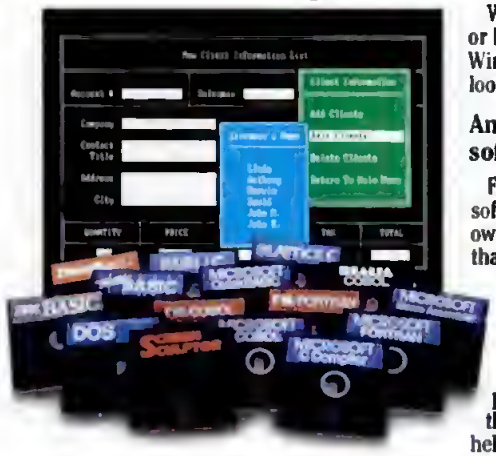
# Flash-Up Windows™ puts menus and help windows in everybody's software.

## Theirs.

## Theirs.

## Theirs.

## And even yours.




Whether you bought your software or built your software—Flash-Up Windows makes it faster, better looking and easier to use.

### Any-kind-of-window-you-want software.

Flash-Up Windows is a new kind of software that lets YOU create your own powerful, customized menus that you can put anywhere to do just about anything.

Just use our powerful window editor to draw your windows. Then pop them up—either automatically from a program, or by pressing a preassigned key. Use them to send commands, provide help, and control entire systems.

### Online context-sensitive help.

Design custom made help windows and include them in all your software. Online, context-sensitive help that's instantly available wherever you are in a program.

### Powerful menu-driven macro ability.

Just like keyboard macro utilities, Flash-Up Windows can be used to send repetitive keystrokes and commands automatically. But Flash-Up Windows lets you select your macros from menus—the same Flash-Up menus you use in all your software.

### Control Flash-Up Windows with your programming language.

DOS, BASIC, Turbo Pascal, dBASE, 1-2-3... virtually every application language can easily send commands directly to Flash-Up. To assign windows to keys (for the user to select later) or automatically display menus and help windows. So, even your own customized software can be controlled with the same consistent menu interface.

### No-Risk Demo Offer!

Order now and receive a demo disk with the package. Use the demo and the manual for 30 days. If you're not satisfied—for any reason—return the entire package for a full refund.

Flash-Up Windows. $90.

Credit card orders call 24 hours a day:

**1-800-872-8787**

Operator 310.

All other orders and inquiries call or write:
Software Bottling Co., 6600 Long Island Expy.
Maspeth, NY 11378 718-458-3700.

THE SOFTWARE BOTTLING COMPANY OF NEW YORK

Requires an IBM PC XT AT or true compatible 256K. The following are trademarks or registered trademarks of the companies indicated MultiMate Multinate International, an Ashton Tate Co., XyWrite XyQuest Inc. Wordstar 2000 MicroPro International Corp. WordPerfect, MathPlan WordPerfect Corp. Volkswriter Lifetree Corp. PFS Write PFS File Software Publishing Corp. Lotus & 1 2 3 Lotus Development Corp., SuperCalc 4 Computer Associates International Inc. Framework, dBASE Ashton Tate Co. Enable The Software Group. Javelin Javelin Software Corp. Q&A Symantec Corp. Paradox Ansa Software R Base Microrom Inc. Turbo Pascal Borland International Reality Reality, Inc. Microsoft, the Microsoft logo QuickBASIC DOS Microsoft Corp. IBM International Business Machines Corp. RM FORTRAN, RM COBOL Ryan McFarland Corp. Better Basic Summit Software Technology Inc. Lattice Lattice, Inc. Run C Lifeboat Associates. Flash Up Windows, Flash Code & Screen Sculptor are trademarks of The Software Bottling Company of New York ©1987 The Software Bottling Company of New York

CIRCLE 530 ON READER SERVICE CARD

modem at a preset time, call an e-mail system, check for e-mail, download it, send messages, and log off. In addition, the whole procedure can be guarded by error-trapping routines. But you'll have to write the script virtually from scratch.

Sorely missing from *SideTalk* is a simple way to create scripts without having to write programs. At the very least, I'd like to see an automatic learn feature that would create files from actual sessions and let you edit them later. Even a series of sample scripts would make a welcome starting point. Lattice is aware of this deficiency and is giving copies of *SideTalk* to bulletin board SysOps in the hope that they will develop script files and put them on their bulletin boards.

Also notable for its absence is a built-in editor for creating script files. The files can be edited by any text editor that can store files in ASCII format. I suppose most people have such editors, but I was taken aback by the suggestion that if your word processor can't do this, "we suggest getting acquainted with the line editor EDLIN."

As you might guess from the nature of *SideTalk*'s command language, Lattice sees its primary customers as programmers and VARs. If you are a communications novice looking for an off-the-shelf product, this is probably the wrong choice, although a Lattice spokesman says that the program is evolving in that direction. Stay tuned for further developments. PC

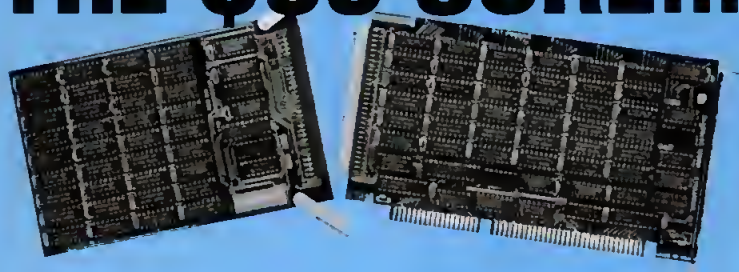
*M. David Stone is a contributing editor of* PC Magazine.

## PC MAGAZINE EDITOR'S CHOICE

- Relay Gold
- Relay Silver

*Each of these programs is aimed at a different kind of user, which means that choosing either one of them is partly a matter of taste. Even so,* Relay Gold *and* Relay Silver *are the clear picks for Editor's Choice because of their combination of polished feel, sophisticated script language, and high level of compatibility with other programs. Offering nearly the same level of program compatibility, along with additional usefulness as a telephone management program, is* Alexander-Plus Data II. *For the moment, call* Alexander-Plus *a close second—just how close won't be known until the U.S. debut of the package.*


# THE $99 CURE...



## FOR "SLOT PHOBIA."
## Snap two half cards into one slot.

**FIRST CURE:**
- Conventional memory, EMS memory and EM memory...up to nine megabytes in one slot.
- Snap doses of 1, 2, 4 or 8 megabytes behind the one megabyte primary board.

**SECOND CURE:**
- All the video input/output you could ever need for your XT™ or AT™.
- Snap your choice of video cards behind a primary I/O board.

**THIRD CURE:**
- All the memory you could ever need for your PC/XT. . up to 8 megabytes of EMS memory in one slot in easy to take doses of 1 to 8 megabytes.

**A NEW INDUSTRY STANDARD:**
- First to get more than 3 megabytes in one slot
- First "Z" Bus for snapping two half cards together to create the equivalent of two full length cards in one slot.
- First to offer card trade-ins for future memory and video needs.
- First to allow you, the buyer (and not a profit hungry manufacturer) to decide how you spend your hard-earned money.

For more information see your local, authorized ZUCKERBOARD reseller or call **1-800-824-4920** in the U.S. or **1-800-458-6200** in Calif.

**Advanced Transducer Devices, Inc.**
235 Santa Ana Court,
Sunnyvale, CA 94086
Telephone: (408) 720-1942

## It's another ZUCKERBOARD

IBM, AT and XT are registered trademarks of International Business Machines Inc.
It's another ZUCKERBOARD is a registered trademark of Advanced Transducer Devices, Inc.

CIRCLE 106 ON READER SERVICE CARD

# Unless you are using QUICKcache™, your disk drives are slowing your system down!

Every time your computer uses the disk drives, you are losing valuable time. QUICKcache is an amazing program that will increase your computer's disk access speed by eliminating the need for physical disk access. QUICKcache is not an expensive hardware addition. QUICKcache is a disk cache (pronounced like cash) that uses fast RAM memory to store the programs and files you use most.

## FASTER THAN THE FASTEST DISK DRIVES

QUICKcache works by loading the programs and files you use into your computer's memory and holding the information. When you exit and re-load a program, or when your application calls for a read from disk, QUICKcache immediately supplies the information from memory so your disk drives are not used at all! QUICKcache will astound you when it shows you just how many disk accesses and how much time you are saving. And because QUICKcache buffers more sectors each time you access your disk drives, *the more you use your computer, the faster it goes!*

## QUICKcache ONLY READS AND WRITES NEW INFORMATION

QUICKcache is a "writing-through" cache so it is 100% safe. All new information is updated in RAM and on the disk so you never have to worry about power failures or system reboots. But if your programs and files have not changed since they were read from disk, QUICKcache prevents the system from over-writing them back on the disk. You not only save time, you prolong the life of your disks and your disk drives!

## QUICKcache WILL IMPROVE THE SPEED OF EVERY SYSTEM

QUICKcache will increase the speed of any system from a "stripped-down" PC to a Turbo-charged AT (and compatibles). QUICKcache will speed up floppy and hard drives and can utilize up to 2 Megabytes of Above board memory.

QUICKcache is extremely easy to load and use. All you do is set the amount of memory to use for the cache, and QUICKcache does the rest. It even keeps track of the information you use most often, so if the cache memory is filled, QUICKcache automatically replaces the least-used information with the new programs or files.

## ONLY QUICKcache GIVES YOU ALL THESE FEATURES:

- Speeds by eliminating disk access
- Works with any floppy or hard disk drive
- Prolongs disk drive and media life
- Quick, Simple installation
- You set size of cache memory up to 2 Megabytes
- Disable disk caching easily for disk copies, etc.
- Pop-up Display of disk performance statistics
- Compatible with ALL applications—including memory-resident programs
- Works with regular or Above board memory
- Completely transparent to users
- Not copy protected
- Complete user's manual and documentation
- Only $49.95 (with limited-time offer)
- 30-day Money-back guarantee if not 100% satisfied

Don't let your disk drives slow you down. Return this coupon with payment today!

**ONLY $49.95 Limited Time Offer**

Money-Back Guarantee if not 100% satisfied.

MasterCard VISA

☐ Please send QUICKcache to:

Name:_____

Address:_____

City_____ State_____ Zip:_____

Telephone_____

Send to: NSD 214½ W Main Street, St. Charles, IL 60174

Or call (312) 377-5151 with your credit card for immediate shipment.

CIRCLE 220 ON READER SERVICE CARD

# FORTRAN PROGRAMMERS

## LCS ANNOUNCES F77L LAHEY FORTRAN VERSION 2.20
## WE JUST MADE OUR TOP RATED FORTRAN LANGUAGE SYSTEM BETTER.

***"Lahey's F77L FORTRAN is the compiler of choice. It's definitely a 'Programmer's FORTRAN,' with features to aid both the casual and the professional programmer . . . F77L compiled the five files in a total of 12 minutes, which was 4 times as fast as MS FORTRAN and an astounding 6 times as fast as Pro FORTRAN..."***

**—Editor's Choice *PC Magazine***

***HERE ARE JUST A FEW OF THE REASONS WHY F77L IS THE COMPILER OF CHOICE:***

- Full Implementation of the ANSI 77 Standard
- Fast Compilation—outruns everything on the market
- Powerful Multi-Featured Source On-Line Debugger
- Popular Extensions for easy porting of mainframe and mini computer programs (Including NAMELIST)
- Recursion—allocates local variables on the stack
- Arrays and COMMONS greater than 64K
- Clear and Precise English Diagnostics
- Long Variable Names—Up to 31 Characters
- COMPLEX*16, LOGICAL*1 and INTEGER*2
- IEEE Standard Floating Point
- Compatibility with popular third party software
- Unmatched Technical Support with an on-line bulletin board

**NEW FEATURES WITH VERSION 2.20:**

- Cross reference and source listings
- Allocation maps of COMMON variables and arrays
- In-line comments
- IMPLICIT NONE compiler option
- Faster Execution
- Source On-Line Debugger (SOLD) includes: Trace Execution; No Relinking required; On-screen Listing; No effect on code size

**Call about our New F77L development tools:**
**Lahey Profiler  Mathematical Functions Library  Overlay Linker**

It is more than just features that make F77L an outstanding product; it is the years of experience behind the software. At Lahey Computer Systems, we have been developing FORTRAN compilers since 1967 and we are committed to keeping F77L the industry leader.

When *PC Magazine* selected our version 1.35 as the Editor's Choice among PC FORTRANs, we were pleased but not completely satisfied—we knew we could improve the product. F77L Version 2.20 increases our lead over the competition. F77L's precise diagnostics, advanced debug package, helpful user screens and comprehensive manual make it a complete and easy to use high productivity tool.

When evaluating any software package, an important factor to consider is the value of your time. F77L saves you time and money the moment you start using it. Our FORTRAN Language System has the key features you need to increase productivity and get the job done. Other PC FORTRANs may be cheaper than F77L, but none are less expensive to use.

**F77L—THE PROGRAMMER'S FORTRAN**

Price: $477.00  Includes Free UPS 2nd Day shipping.
System Requirements: MS-DOS or PC-DOS (2.0 or greater), 256K, math coprocessor (8087-80287)

**TO ORDER OR FOR MORE INFORMATION:**
**702-831-2500**

**Lahey Computer Systems, Inc.**
**P.O. Box 6091, Incline Village, NV 89450**
**Telex: 9102401256**

**International Representatives:**
**Canada:** Barry Mooney & Assoc., Tel (902)6652941 • **England:** Grey Matter Ltd, Tel (0364)53499 • **Switzerland:** DST Comp Services, Tel (022)989188
**Denmark:** Ravenholm Computing, Tel (02)887249 • **Australia:** Comp. Transitions, Tel (03)5372786 • **Japan:** Microsoftware Inc., Tel (03)8138222

MS-DOS & MS FORTRAN are trademarks of Microsoft Corporation. Pro FORTRAN refers to IBM PC Professional FORTRAN by Ryan McFarland

CIRCLE 526 ON READER SERVICE CARD

PC MAGAZINE PRODUCTIVITY

■ PC LAB NOTES: TURBO BASIC ■ ETHAN WINER

# TURBOCHARGING BASIC, PART 1

*Close on the heels of Microsoft's QuickBASIC, Borland responds with Turbo BASIC. Our reviewer says it's been worth the wait, but you must be the jury.*

One of the best things about BASIC is that it can do just about anything. Unlike such languages as Pascal and C, BASIC contains built-in commands that let you generate sophisticated graphics, peek and poke memory locations, and even manipulate hardware ports. Add—as does Microsoft's recently introduced QuickBASIC—the ability to compile programs in memory, where they can be run and tested immediately before being compiled to disk as an .EXE file, and you might even be tempted to doubt whether BASIC needed any new features at all. At least, that's what I thought until I got Borland's Turbo BASIC.

For starters, where regular BASIC handles only 2-byte integers, Turbo BASIC adds a 4-byte type to eliminate rounding errors when dealing with dollar amounts. Where regular BASIC restricts the Option Base for array subscripts to either 0 or 1, Turbo BASIC will accept any reasonable range. And where regular BASIC ignores an 8087 numeric coprocessor, Turbo BASIC lends it full support. (See sidebar "Floating Points and the 8087.") But that's just the tip of the iceberg, and in this two-part article I'll take a look at the wealth of enhancements Borland has brought to the BASIC language.

If you're at all serious about programming in BASIC, you're aware of a number of significant recent advances. BASIC took a giant step towards being recognized as a serious language when IBM/Microsoft released the original BASCOM compiler. Summit Software (BetterBASIC) and others then improved on BASCOM, adding such features as path support, line labels instead of numbers, true procedures, et al. Not to be outdone, Microsoft responded with its own QuickBASIC, Version 1, quickly followed by Version 2. [*And now it comes with 8087 support and many new features in Version 3. See First Looks in this issue.—Ed.*] Now Borland has entered the fray. And, of course, the real winner in this battle for the best BASIC is you.

Like Turbo Pascal (with which Borland pioneered the concept), Turbo BASIC provides a complete, self-contained programming environment. Source files are created, edited, debugged, and run, all within this comfortable setting. Extensive use of windowing affords you multiple views of your program. An edit window holds the source text, a second window displays the program's output, and various other windows are used to show the system menus, error messages, directories, etc. These windows can be turned on or off, or zoomed to the full size of the display screen and back.

Moreover, the entire setup may be customized, which allows you to specify and save to disk your choice of default compile options, colors, etc. You can also create separate configuration files for, say, developers and users, and call up whichever is needed at the time. All aspects of the Turbo environment can be customized—even whether or not to save your source programs automatically. (My favorite option is the one that allows me to turn off automatic generation of those blasted .BAK files—something long overdue from Borland, and greatly appreciated.)

Apart from providing such ideal working conditions, there is much more to the Turbo BASIC system. Among its impressive collection of added commands are some truly revolutionary developments, on which I'll concentrate here.

**FASTEST PRINT IN THE WEST** To say that the PC's BIOS display routines are slow is like saying that Albert Einstein was fairly bright. Nearly all of the major applications for the PC family circumvent these well-intentioned but pathetic services with


**PRODUCTIVITY INDEX**

**PC LAB NOTES**
Meet Borland's new Turbo BASIC with its revolutionary features.
**PROGRAMMING/UTILITIES**
DRAW turns your computer into a sketchpad without BASIC's help.
**SPREADSHEET CLINIC**
Hide info; embed printer setup strings; print files continuously.
**CONNECTIVITY CLINIC**
Communicate LAN-to-LAN; set up specs for a Request for Proposals.
**TURBO POWER USER**
Determine the space left on a disk; send I/O devices with Turbo.
**USER-TO-USER**
Convert files to all upper- or lowercase; measure memory needed.
**PC TUTOR**
Using the EGA with QuickBASIC; switching between two printers, PC slot 8 warning.

■ PC LAB NOTES

# FLOATING POINTS AND THE 8087

Automatic support for the 8087/80287 family of numeric coprocessors is one of the most important features Borland included in Turbo BASIC. Providing that support, however, required a departure from the usual way of handling floating-point numbers.

The IEEE, an international standards organization, has established a method for storing floating-point numbers in binary form. Microsoft, however, chose to ignore that standard and use its own proprietary approach instead. The trouble is that the 8087 math coprocessor requires numbers in the IEEE format. It's too late now for Microsoft to switch, as it must maintain compatibility with its own older versions of BASIC. (That's why you'll probably never see 8087 support built into QuickBASIC.) How, then, can Borland do it, since it must also be compatible? Simple enough—Turbo BASIC gives you both types.

The only time the format of the numbers really matters is when they are read from or written to a disk file, using MKS$, CVD, et al. After all, simply changing the *internal* format does not by itself create incompatibilities. Problems arise only when a "new" program attempts to read a data file that was created by an "old" one, and vice versa. Therefore, in addition to the usual translating functions, Borland has included an additional, parallel set that will read and write Microsoft numbers.

Thus, while Turbo's MKS$ and MKD$ convert single- and double-precision values into the corresponding 4- or 8-byte IEEE format, MKMS$ and MKMD$ convert them to Microsoft's specifications, instead. Likewise, CVS and CVD convert from IEEE on a disk to floating point, while CVMS and CVMD convert from Microsoft.

If you are creating programs that must be compatible with other BASIC compilers, then you should use the Microsoft version of these functions. Of course, this won't prevent a program from fully utilizing the 8087, since the numbers are still inside the computer in the proper IEEE form. The only difference will be the slight amount of added time required to perform the conversion, prior to reading or writing.

Since only floating-point numbers are affected, new versions to augment MKI$ and CVI are not needed—the original forms still work fine. Note, however, the addition of MKL$ and CVL, which Borland included to handle the new long integer variable type when working with random access files.

**PHANTOM COPROCESSOR** Another wise decision on Borland's part was to emulate the 8087's operation if one is not present. The advantage of doing this is that all internal calculations are maintained to an accuracy of 80 bits, which is very precise. For simple formulas and calculations, you won't see much difference. But when there are many levels of nested parentheses, or a number of intermediate calculations are required to obtain a final result, the normal rounding errors are greatly minimized.

Unless you specify otherwise when compiling, a Turbo BASIC program will include routines both to utilize the 8087 coprocessor and to simulate it. When your program runs, it checks to see if the device is present and uses whichever code is appropriate.

The 8087 emulation routines are very accurate, but they are also quite complex, adding about 9K of code to your programs. Therefore, an "8087 required" compile option is included that lets you indicate whether the routines are really needed. If you are certain that the target PC has the device, then you would turn this option on.

Besides added code size, the other possible drawback to 8087 emulation is speed. Nothing ever comes for free, and so it is with 80 bits of precision. With no way to turn it off, most floating-point operations in Turbo BASIC will be slower than when done in QuickBASIC.

**—Ethan Winer**

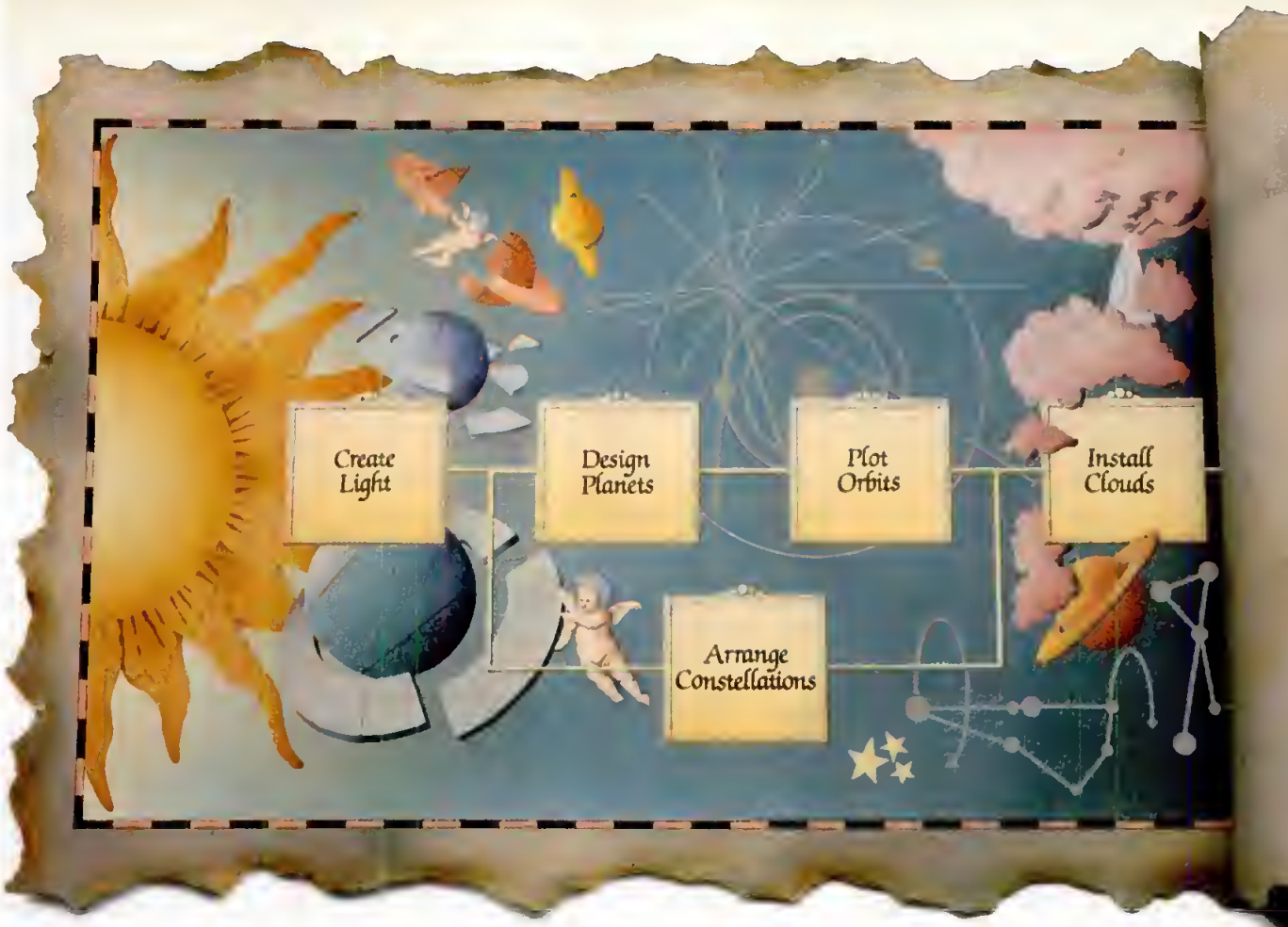
those of their own. (The most common technique involves poking the characters to be printed directly into display memory.) In fact, one sure giveaway that a program was written in BASIC—even compiled BASIC—is the time it takes to display a screenful of text. Where *1-2-3* and *The Norton Utilities* provide snappy, instant screen updating, it takes conventional BASIC 2 seconds or more to ripple the same amount of text down the CRT display.

Fortunately, that's all behind us now, because Turbo BASIC optimizes the method it uses to print text based on the type of display adapter it detects when a program runs. Because of the additional overhead the Turbo editor must perform while you're working in its environment, you won't see the fast screens there. But when you run the final .EXE program from the DOS prompt, be prepared for a very pleasant surprise.

**WHAT, NO COMMAND.COM?** One of the most annoying things about many .EXE programs is the way they gobble up all the PC's available memory. This ordinarily wouldn't matter very much, except that the DOS command interpreter (COMMAND.COM) gets trashed in the process. Thus, when these programs end, the PC stops dead in its tracks and you get the infamous message, "Insert disk with COMMAND.COM." With Turbo BASIC, this is a thing of the past. Provided your system has sufficient memory, Turbo BASIC will not overwrite the area that holds your COMMAND.COM.

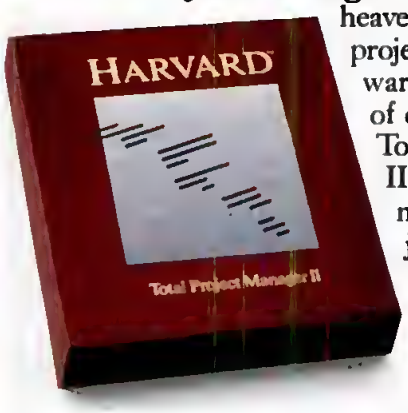
Yet another outstanding Turbo feature is its ability to time events to a resolution of 2 microseconds. Even though DOS updates the PC's system clock only 18 times per second, Borland's clever designers utilized an often overlooked feature of the PC. By reprogramming the timer chips, nearly any desired resolution is attainable.

When used as a statement with no arguments, MTimer resets the microtimer to begin clocking an event. When used as a function in an assignment, it instead re-




# NOW IT'S EASIER TO MOVE HEAVEN & EARTH.

***Introducing Harvard Total Project Manager II.*** If you have to move heaven and earth, the best project management software can make a world of difference. Harvard Total Project Manager II (HTPM II) lets you manage important projects faster and easier, with earth-shaking new features.




Finally you can plan your project directly on the computer. HTPM II's unique graphic Work Breakdown Structure lets you identify all your project's tasks entirely on-screen. From there, it's easy to optimize your project's plan through a program-generated PERT chart.

Or, if you prefer, you can create or manage your project in the PERT chart, Gantt chart or HTPM II's own Task List format.

With HTPM II, managing resources has never been easier. When you're juggling several projects, you can track allocations across all jobs and be instantly alerted to over-commitments. Automatic resource leveling easily resolves complex conflicts, too.

HTPM II also clearly displays actual vs. planned and baseline information on-screen, to help evaluate costs and scheduling.

And, for presentation-quality reports, HTPM II supports an expanded list of peripherals, including the HP Laserjet and many plotters.

So for better planning, scheduling, controlling and reporting, choose HTPM II. Because with Harvard Total Project Manager, the sky's the limit!

***For a free trial size diskette call 1-408-848-4391.***
***For upgrade information call 1-800-255-5550.***

## GRADUATE TO HARVARD TOTAL PROJECT MANAGER II.

Runs on IBM XT with hard drive and MS DOS compatibles. Software Publishing Corporation, P.O. Box 7210, Mt. View, CA 94039-7210.

## ■ PC LAB NOTES

```
MTimer                    'begin timing
Pi# = 4# * Atn(1#)        'double precision is most accurate
Elapsed = MTimer          'read the elapsed time
Print "It took" Elapsed "microseconds to compute Pi"
```

**Figure 1:** *An example of Turbo BASIC's microtimer function.*

```
Open "Filename" For Binary As #1    'open the file
Seek #1, Location                   'set file pointer
Get$ #1, Bytes, Destination$        'get the data
```

**Figure 2:** *The syntax for Turbo BASIC's new Get$ instruction.*

turns the number of microseconds that have since elapsed. An example of a short routine used with MTimer is shown in Figure 1. Besides letting you compare the efficiency of various programming techniques, MTimer could also be useful in an industrial control program, or anywhere else accurate time measurements are needed. Nice work!

**BINARY DISK FILES** Equally revolutionary is a new type of file reading/writing capability that Borland calls Binary. Where DOS and regular BASIC access files either sequentially or on a record-by-record basis, Turbo BASIC also lets you read or write any portion directly. To do the same thing in QuickBASIC or BASICA would require either constantly opening and closing the file with different record lengths or dealing with a zillion one-byte records.

Three new instructions have been added for binary access. The Seek statement sets the location of a special file pointer that determines where the next read or write will take place. (The corresponding Loc function returns the pointer's current setting.) Get$ and Put$ are then used to do the actual reading and writing. (See sidebar "Self-modifying Programs: A Unique Use for Get$ and Put$.") Since the whole point is being able to specify not only where in the file to read or write, but also how much, you include this information as well. Figure 2 shows the syntax for these instructions.

The variable Location contains the desired offset into the file, Bytes is the number of bytes to read, and Destination$ is the string variable that will receive the file's contents. Unlike the BASICA interpreter, Turbo BASIC strings may be as long as 32,767 characters, which allows for some pretty hefty file manipulation. The complement to Get$ is Put$, which lets you write to any portion of a file. The syntax for Put$ is similar to that for Get$, though the length is not given:

```
Put$ #1, Source$
```

In this example, the entire length of Source$ will be written to the file at the current Seek file pointer location. To place only the first, say, 20 characters of a string into the file, you would use Left$ instead:

```
Put$ #1, Left$(Source$, 20)
```

Notice that Get$ and Put$ are much more than a slightly enhanced Get and Put. Specifically, Get$ overcomes the two important limitations of its predecessor, Input$. One of the biggest problems with using Input$ to read a file is that it gives up whenever it encounters a 26—the DOS end-of-file marker. This limits its usefulness to pure ASCII text.

The second problem with Input$ is that there's no way to back up the file pointer. While normally this is not serious, there have been times when I sorely missed that capability. Before Get$, the only recourse was to close the file, open it again, and start all over from the beginning.

**TRUE RECURSION** Perhaps the most revolutionary of Turbo BASIC's new capabilities is its ability to use recursive functions and procedures. By definition, a recursive procedure is one that may call itself when necessary. Similarly, a recursive function may include a reference to itself within its own definition, something strictly forbidden in BASCOM and QuickBASIC. While this may not be a feature that you'd use every day, it's the best solution for some types of programming problems, and I'll discuss it in detail in Part 2 of this article.

While these features alone would make Turbo BASIC a remarkable compiler, we're far from through. Not only is this the most advanced BASIC ever, but Borland has lived up to its Turbo tradition. Programs compile much faster than in QuickBASIC, and in many cases they execute more quickly as well. Furthermore, the .EXE files that Turbo BASIC creates are true standalone programs. Although QuickBASIC can compile directly to an .EXE disk file, such programs require a run-time library when they execute.

It's no secret that if you enable event trapping in the Microsoft BASIC compilers, it slows down the resultant program appreciably. While this is perfectly understandable, what is a shame is that the slowdown affects even portions of the program that are not trapping keystrokes or COM port activity.

Turbo BASIC, on the other hand, lets you specify where and when event trapping is to be enabled (see sidebar "Metastatements in Turbo BASIC"), so only those portions of the program will be affected. Furthermore, you don't have to specify that you'll be using this feature up front. Rather than report an error, Turbo simply adds the necessary event-handling code to your program.

**LONG INTEGERS** One of my biggest peeves about BASIC was the way a sequence of many calculations could cause a cumulative error. These are frequently called "penny errors," and they're an unavoidable side effect of the way a PC stores numbers internally. In order to accommodate the enormous range of values necessary, floating-point numbers are converted to a special exponential form. But since the numbers must be stored in a limited number of binary digits, some degree of rounding is inevitable.

To overcome this, many languages offer a long integer variable type that is comprised of 4 bytes instead of only 2. This yields an absolute range slightly greater than plus or minus 2 billion, although, of course, fractions are not permitted. But if

# PC MAGAZINE LEADS YOU OUT OF THE INFORMATION JUNGLE...

Exploring the PC market is a confusing, and often risky, endeavor.

Lose your way, and you lose valuable time. One wrong turn, and you can lose lots of money.

That's why IBM and compatible PC users look to *PC* Magazine. *PC* Magazine eliminates the risk in purchasing decisions with comparative reviews and product evaluations from the PC Labs, where products are tested the way you use them every day. It's the pathfinder to products that meet your specific needs —and those of others in your company.

*PC* Magazine puts you on the trail to new applications with power tips and special reports that will help you make the most of your system.

*PC* Magazine goes one step beyond leading you through the microcomputing jungle. *PC* Magazine leads you *out* of the jungle to the PC environment that meets your daily demands.

**Subscribe now and save 62%.**
**For fast service, call toll-free**
**1-800-852-5200**

4Z064

PC MAGAZINE
**For product reviews you can use.**

■ PC LAB NOTES

# SELF-MODIFYING PROGRAMS: A UNIQUE USE FOR GET$ AND PUT$

Because Get$ and Put$ can read or write any part of any file, it is fairly simple to modify a compiled BASIC program on disk. But why would you ever want to do that? Well, one possible reason would be to store custom configuration details within the program, as opposed to requiring them to be put in a separate disk file.

Many applications depend upon some sort of configuration file to store the path or drive letter for saving data or to store other custom setup information. While there's nothing wrong with this approach, it does mean that an extra file is needed. Borland's *SideKick*, by contrast, stores its setup info within the program file proper, using SKINST.COM to perform the modification. In playing around with Turbo BASIC for this article, I found it quite easy to do the same with the BASIC .EXE programs it creates. Here's one approach.

First, write the program as you normally would, but using a string of asterisks (or some other unlikely character) in place of the actual data. For example, if the program will be reading a disk file, write the instructions thus:

```
Open "***************" For Input As #1
```

This leaves enough space for a drive and filename to be added later, while creating a unique string that can easily be found later on. Next, compile the program to disk and quit Turbo BASIC.

At this point you could use DEBUG to locate the asterisk string, but this would be a real pain. Because of the way DEBUG loads an .EXE file, you'd first have to rename the program to change its extension (to something like .XXX). Worse, if the string were located more than 64K into the file, you'd have extra work to do to obtain the actual address. Finally, when you got an address, you'd have to subtract 100h in order to find the true offset, since the address that DEBUG reports is always 100h higher than its actual location.

The program shown in Figure A will search a compiled program for you and report the location of any string as a single precision offset into the file. Once this location is known, you would create

```
Line Input "Program to search: ", FileName$
Line Input "Text to find     : ", Text$
Open FileName$ For Binary As #1

GetLoop:
     BaseAddr = BaseAddr + Bytes

     If Lof(1) - Loc(1) => 20000 Then    'at least 20K still
        Bytes = 20000                    '  to be read
     Else
        Bytes = Lof(1) - Loc(1)          'less than 20K,
     End If                              '  calculate how much

     Get$ #1, Bytes, Temp$               'get a chunk
     L = Instr(Temp$, Text$)             'search it
     If L Then Print "Found at" _
        BaseAddr + L - 1 : Goto Done

     Seek #1, Loc(1) - 2000              'back up to avoid a
     BaseAddr = BaseAddr - 2000          '  possible miss at
                                         '  the 20K boundary
     If Bytes = 20000 Goto GetLoop       'still more to get
     Print "Not Found"

Done:
     Close
```

**Figure A:** *SEARCH.BAS, a program that searches an .EXE file for text strings.*

you consider the value to be in cents (the most common approach), this scheme will accommodate amounts greater than $21 million without ever losing or gaining a penny. Moreover, calculations made using long integers take much less time than if they were performed on floating-point numbers. With Turbo BASIC, you can have this feature too. Long integers are declared with the ampersand (&) like this:

```
X& = 1235231
```

Two new commands have been added to support long integers. A new form of the Cint function, Clng, will round the fractional portion of a number either up or down, instead of merely truncating it. Deflng augments Defint, Defsng, Defstr, and Defdbl, letting you declare variables globally as long integers without requiring an explicit ampersand.

At present, however, Turbo BASIC's long integers will not accept a number of useful integer functions, such as And, Mod, or integer division. This is unfortunate: there have been many occasions when I needed to find the Mod of a large number, but was prohibited because it was outside the normal integer range. (These functions can be used with variables that have been declared as long integers, so long as each value is within the "short" integer range of −32,768 to 32,767.) While you're waiting for Borland to add this capability, you should use the function shown below.

```
Input "Number:  ", Number
Input "Modulus: ", Modulus
Print FnBigMod(Number, Modulus)

Def FnBigMod(Number, Modulus)
    Temp = Number
    While Modulus < Temp
       Temp = Temp - Modulus
    Wend
    FnBigMod = Temp
End Def
```

a short "install" program that opened the .EXE program as a file and replaced the asterisks with your text. (If it is a filename, be sure to overwrite any trailing asterisks with blank spaces.) In fact, it wouldn't be too difficult to have a program actually change itself this way! Bear in mind, though, that each time a change is made to the original program, the location of its data will be different.

Two final notes. First, if the same data will be used more than once in a program, you should assign it to a variable and replace that instead. And if a number of parameters are needed, use a string long enough to hold them all in a row. You can easily break them out into separate parts later. For example:

```
File.Name$ = "***************"
```

or

```
Config$ = "********************************"
```

Wherever those asterisks end up, you can still find them.

In Figure A, notice the extra step that backs up the file's location pointer. Without this, there would be a small chance that the string you are searching for would straddle a 20K boundary. If that happened, Instr would not be able to find it.—**Ethan Winer**

The function above also illustrates yet another feature of Turbo BASIC. Notice how the function may be referred to in the program before it has been defined. This is not allowed in BASCOM or QuickBASIC, though the reason why has never been clear to me. After all, subroutines and subprograms may be referenced before they are defined, so why not functions? Though it is admittedly a minor point, I appreciate this added convenience in Turbo.

There are times when the source listing of a program can be made clearer by using descriptive variable names. For example, a database-reporting program might use a variable called Page.Len to hold the constant amount 66. Even if the page length will never be changed, just being able to use a meaningful name can be helpful. This is particularly true if someone else must be able to decipher your source code later on. The only problem is that for each extra variable used, additional program memory will be required to hold it.

Turbo BASIC lets you instead declare a constant amount by name in your program, which is converted to a fixed value when it is actually compiled. Of course, named constants are not a new concept—assemblers have included this feature for years. And although only integer constants may be defined (at least, as of now), it is still a useful and practical addition to BASIC.

A named constant is defined by preceding its name with the percent sign (%), as in the declaration

```
%Page.Len = 66
```

Now, whenever your program refers to %Page.Len, the number 66 will be substituted instead. Notice that a named constant can be assigned only once and that any attempt to redefine it will cause an error when the program is compiled.

**CASE/SELECT** Multiline If/Then/Else testing has been a powerful recent addition to the BASIC language. Turbo's new Select and Case commands take the concept one step further, however. Lifted straight from Pascal, this pair can greatly simplify your job when many involved arbitrary tests must be performed.

```
Select Case Pet$        'select the variable to test

Case "Bowser", "Spot", "Rover", "Fido", "Spike"
     Type$ = "Dog"

Case "Muffin", "Rags", "Mittens", "Tigger", "Whiskers"
     Type$ = "Cat"

Case "Trigger", "Flicka", "Sophie"
     Type$ = "Horse"

Case Else
     Type$ = "Other"

End Select
```

**Figure 3:** *Turbo BASIC's use of Case and Select is similar to that of Pascal.*

As an example, suppose you are writing a program for a pet store and that it must compare an animal's name to a list of possible entries. Using Select and Case allows writing the instructions as shown in Figure 3.

In Figure 3, the variable to be tested is first identified, using the Select command. By allowing you to select it only once, the amount of coding is appreciably reduced. Next, a series of possible "Cases" is given, followed by the statements to execute if a match is found in the list. Even though this example merely assigns the variable Type$ depending on the pet name, any number of statements may be listed between the various Case arguments. Notice how the Case Else allows you to specify an alternate action, in the event that none of the tests was true. Finally, the end of the Case block must be given, much the same as an End If statement.

To accomplish the same thing in regular BASIC would require an enormous number of If's and Or's and Else's, of the pattern

```
If Pet$="Bowser" Or Pet$="Spot"_
Or Pet$="Rover" Or . . .
```

One other important feature of Case/Select is its ability to accept not only a table of possible choices, but a range of values as well. For example, if numbers are being tested, your code could be reduced even further, thus:

```
Select Case X
Case 1 To 4, 23, >135
```

In this example, any statements that follow

■ PC LAB NOTES

# METASTATEMENTS IN TURBO BASIC

Besides adding many new BASIC programming commands, Turbo also adds a number of new "metastatements." Metastatements are instructions to the compiler—as opposed to BASIC commands—that are used to specify various options.

Like QuickBASIC, Turbo's metastatements let you include the text of one source program within another and to declare subsequently dimensioned arrays as either Static or Dynamic. But there are many original metastatements in Turbo BASIC, so let's concentrate on those instead.

Unlike QuickBASIC and BASCOM, where metacommands are always included within a remark, Turbo's metastatements stand on their own. However, they all still begin with a leading dollar sign ($).

```
' Program.Bas
@SuperSpiffy% = 1        'make this the better version
.
.                        'code common to both versions
.
$If @SuperSpiffy%
.                        'compile this section only if
.                        '  @SuperSpiffy% is not zero
.
$EndIf                   'everything past here is compiled
.
.
```

**Figure A:** *An example of Turbo BASIC conditional compilation code.*

**COMMUNICATIONS** $COM*n* is used to establish the size of a receiving communications buffer. In many programs, if this buffer is not large enough, some of the incoming data will be lost. And, of course, if the buffer is too large, then memory is wasted. By allowing you to set the correct size yourself, even if only by experimentation, the communications buffer size can be tailored to the exact needs of a given program. Notice that if $COM*n* is not used at all, the buffer size will default to only 256 bytes.

Two parameters must be supplied—the COM port number (either 1 or 2) and the desired size (*n*) in bytes. The example below sets aside 4K of space for the COM2 receiving buffer:

```
$Com2 4096
```

**EVENT HANDLING** $Event is one of my favorites, because it allows you to turn event handling on and off at will. Normally, whenever Turbo BASIC encounters an event type of instruction (such as On Key or On Com), it begins adding the code needed to trap these conditions between each program statement. But if part of your program needs to sort

will be executed if *x* is between 1 and 4 (inclusive), is equal to 23, or is greater than 135. In situations such as this, an enormous amount of coding effort is saved by using Case. Incidentally, even string arguments can be compared this way. To test if a character is a letter, as opposed to a number or punctuation, you could say

```
Select Case Char$
Case "A" To "Z", "a" To "z"
```

and to test if the character is a control code you might use

```
Case < " "
```

or

```
Case < Chr$(32)
```

One small criticism I would offer is that if the variable fails all of the tests and no Case Else clause has been provided, Turbo BASIC will generate an error. This situation should be handled in the same way as On-Goto and If, where the program simply proceeds to the next instruction.

**TRUE LOCAL VARIABLES** With the introduction of QuickBASIC and BASCOM 2, programmers acquired the ability to declare variables as local to a given procedure or function. Unfortunately, this feature is only partially implemented in those BASICs. When used in a QB2 subprogram, variables can be declared either Shared, Static, or neither. (Not declaring a variable means that it will be created when the subprogram is run.) But in a function definition, there is no way to establish a variable as being truly temporary.

Turbo BASIC offers an additional variable type—Local. These variables are always created at run-time and, in fact, are stored on the stack. The importance of true local variables becomes apparent once recursive functions are used. Since QB2's variables always occupy a fixed place in memory, recursive calls to the same procedure will wipe out the values from a previous invocation. Genuine local variables, on the other hand, are retained on the stack, and each new level simply piles them higher and higher.

Array subscripts are one of my favorite Turbo BASIC features. For the first time, a BASIC array does not have to begin with either element 0 or 1. In my "A Wish List for QuickBASIC 3" (Volume 6 Number 1) I mentioned how nice it would be to allow Option Base to be set to any reasonable value. Borland has done just that.

Rather than alter the way Option Base works, though, Turbo BASIC has you instead specify the range as part of the Dim statement. Thus, to dimension an array as having 100 elements numbered 1901 through 2000, you would do this:

```
Dim Sales.Year(1901 : 2000)
```

The colon is used as a separator between the upper and lower array bounds. This feature can greatly contribute to a BASIC program's readability, which to me is very important. To accomplish the same thing before Turbo BASIC, it would be up to your program to keep track of the

an array or perform some other time-critical operation, you can temporarily disable event trapping, as shown below.

```
Sub Sort(Array#(1)) Static
    $Event Off
    .
    . 'this code must be fast
    .
    $Event On
End Sub
```

**CONDITIONAL COMPILATION** $If, $Else, and $EndIf form yet another powerful Turbo feature that lets you specify whether certain portions of a source listing are to be included in the final compiled program. For example, you may sell two different versions of your current masterpiece, with one offering more features (for a higher price, of course!). As every software developer knows, maintaining two similar programs can be a real pain, especially if you make frequent additions and improvements.

You tell Turbo BASIC whether or not to compile a section of code with the $If, $Else, and $EndIf metastatements. This is a natural use for Turbo's new named constants, since a value is always used as the criterion. The idea here is that just before you compile each version, you would change the setting of this constant. Figure A provides an example of these metastatements in action.

**MORE MUSIC** If you like to use the Play command to keep a tune running in the background during your programs, the $Sound metastatement will let you override the default buffer size of 256 bytes. Any value (up to 4,096 bytes) can be specified. For example,

```
$Sound 2000
```

would set aside 2,000 bytes for the Play buffer.

**SIZING THE STACK** The $Stack metastatement lets you declare the size of a program's stack, as opposed to the older method that uses the Clear command. Normally, the default stack size of 768 bytes will be sufficient. But if you tend to use many nested subprograms or employ recursive routines, you may find that a larger stack is necessary. For example,

```
$Stack &H1000
```

will set aside 4K bytes.

If you aren't sure whether your program needs additional stack memory, the best approach is probably to do nothing and see if you get an error message when the program runs. (Be sure to set the "stack checking" compile option on, however.) Then, once you are satisfied that the program operates correctly, turn stack checking off to increase its running speed.

The $Inline metastatement is one of the ways that an assembly program may be added to BASIC and will be discussed in detail in Part 2 of this article. There, too, is the place to cover the $Segment metastatement, which Turbo BASIC uses to begin a new code segment in your program.—**Ethan Winer**

difference between the first subscript and 1, subtracting the two whenever an array element was required.

```
For Year = 1981 To 2000
    Print U.S.Population(Year - 1900)
Next
```

**NOT ALL ROSES** There are, naturally, a few things about Turbo BASIC that could use improvement. For example, the Trace function is nowhere near as nice as the one in QuickBASIC, Version 2. Where QB2 lets you step through a program line by line and view the instructions as they are executing, Turbo offers no such luxury. Instead, only the most recent line label (or line number) is displayed. Furthermore, Turbo BASIC doesn't always respond to the Ctrl-Break combination. Unless the program is doing some type of I/O, Ctrl-Break is simply ignored and execution continues merrily along.

Another limitation shows up when you want to combine assembly language routines with Turbo programs. Though the absence of a link step has several advantages, it makes it more difficult for the assembled routines to maintain their own data storage. Further, as a side effect of Turbo's improved string and array handling, finding where those variables are in memory now requires more steps. (Part 2 will include an in-depth look at combining assembly language routines with Turbo BASIC.)

My biggest complaint, however, is that Turbo BASIC can catch only one error at a time while it is compiling. Unlike QB2, in which up to 26 errors can be found and edited at a time, Turbo stops cold on the first and drops you back into the editor, waiting for you to fix the bugs. Though it compiles faster than QB, this is still a real pain, which I fervently hope will be corrected in the next release.

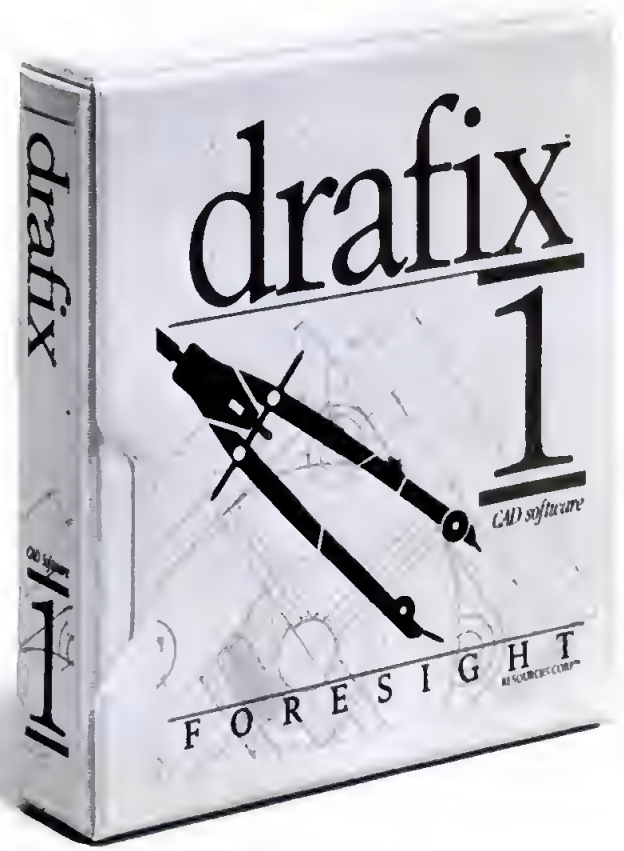
Finally—and this may not be important to many programmers—there is no built-in support for a network. While it is possible to access other DOS system calls through Turbo BASIC, the particular one needed for a network is rather difficult. To lock or unlock a disk file requires obtaining the numeric "handle" that DOS has assigned to the file and then using that as an identifier. You can't just say "Lock #1" as with QuickBASIC.

Even taking these shortcomings into consideration, however, I'm extremely impressed with Turbo BASIC. It's fast, it cooperates with resident keyboard handlers (which QB2 doesn't), it offers a wealth of important new features, and it costs only $99.

But perhaps the most compelling reason why you should consider Turbo BASIC is its future. Borland has made it clear that it intends to improve the product continually. If its past performance with Turbo Pascal is any indication, I have no doubt about the direction in which Turbo BASIC is headed.

*Ethan Winer, an independent consultant, is the head of Crescent Software in East Norwalk, Connecticut.*

# Revolution.




## Drafix 1 CAD, $195

Drafix 1 totally changed the image of low priced CAD software. It proved that you could have extremely sophisticated performance and features demanded by serious CAD users.

Yet still be very easy to learn and use for the novice. All at an amazingly low price.

Now we've done something even more dramatic.

We've improved it.

**Drafix 1 Plus. A great new package at a great old price. $295.**

Reviewers called Drafix 1 a "breakthrough" in design, speed and ease of use.

Drafix 1 Plus is a breakthrough in value.

Check these exciting new features:

—A pop-up text editor for writing, editing and rearranging even large blocks of text.

—Function key macros so you can store and customize Drafix commands to your personal workstyle.

—Sophisticated curve-fitting splines and free-form sketching functions to let you draw complex shapes.

Plus we added two more bonuses. A symbol library (an $80 value) with 450 pre-drawn, time-saving symbols.

And, along with our standard pen-plotter support, our Dot-Plotter software (worth $45) that lets you create high resolution plots of any size on your dot matrix printer.

*Drafix offers the easiest menuing system currently available on any CAD package.*

Of course if these are more features than you need there's an equally good choice—Drafix 1.

**Drafix 1. Everything you want in CAD software—at $100 less.**

Reviewers called Drafix 1 "the best CAD buy in town" at $295. We wonder what they'll say for $100 less.

That's right. The original Drafix is still available at a dramatically reduced price. For just $195 you can have all of the features and performance that made Drafix 1 "the best CAD buy under $500."

**A powerful CAD tool you'll be using in minutes.**

You'll never use an easier menuing system than Drafix. Everything is on display all of the time so there's no searching,

# Evolution.

**Drafix 1 Plus CAD, $295**

backtracking or memorizing.

In just minutes you'll be doing drawings that would take days to learn on most other CAD software.

And you'll find yourself easily using features that are normally found only on software costing more than 10 times as much as Drafix.

Rotating, scaling, stretching and trimming, multiple object snap modes—they're all included along with much, much more.

Drafix is a powerful, full-featured CAD tool. It just doesn't happen to be priced like one.

**Order toll free and get our 30-day money back guarantee.**

One thing hasn't changed. Our money back guarantee.

Try Drafix 1 or Drafix 1 Plus for 30 days and return it for a full refund if you're not completely satisfied.

With no-risk, high performance and affordable prices, there's just one choice to make.

To buy the package that started the CAD software revolution. Or the one that's continuing it.

Make your toll-free choice today.

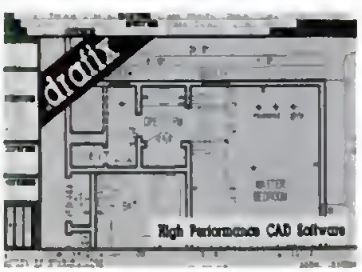
**Order Now!**

Contact your local Drafix dealer or call toll-free

Use your Visa, MasterCard or American Express

**1-800-231-8574 Ext. 550**

- ☐ Drafix 1 CAD package, now only $195.00
- ☐ Drafix 1 Plus CAD package (Includes $45 DotPlotter and $80 symbols library) just $295.00
- ☐ Mouse Systems mouse also available (add $100)
- ☐ Ask about our Architectural, Mechanical and Electrical symbol libraries and OTTO, our AutoCAD File Exchange Utility.




FORESIGHT
Resources Corp.
932 Massachusetts
Lawrence, KS 66044
(913) 841-1121

CIRCLE 386 ON READER SERVICE CARD

# COME HOME TO AMERICA

This All-American 10MHz system features an Intel 80286 processor with 1024KB RAM on the motherboard, a combined floppy and hard disk controller system and a 1.2MB floppy drive. A clock/calendar with battery backup, 5151-style keyboard and 195 watt power supply switchable between 110V/220V makes up our best to you. We offer 48 hour extended burn-in testing, a full one year warranty, FCC class B approval and complete documentation.

**U.S.-286/10MHz $1175**

**EGA Combo $579**
Compliment our US-286/10 with a big screen 14" high resolution, non-glare color display that boasts EGA and color compatibility. Crisp text and vivid color spring to life when used with our enhanced graphics adapter video card which features easily accessible mode switching and 256KB display RAM.

**Monographics Combo $199**
A high resolution monochrome graphics (720 X 348 pixels) adapter card with printer port teamed with a non-glare, 12" flat screen monochrome monitor gives you precise viewing with less distortion. The monitor also comes with the newest tilt and swivel base allowing you full range of motion for your comfort.

**Other Available Items:**

| | |
|---|---|
| • 60MB Tape Backup For The US-286 | $759 |
| • 2400 Baud Internal Modem | $239 |
| • 1200 Baud Internal Modem | $99 |
| • AT Floppy Drive | $109 |
| • I/O Expansion Card | $79 |

**AT Hard Drives**

| | |
|---|---|
| • 20MB—Seagate 65ms Seek Time | $295 |
| • 30MB—Seagate 40ms Seek Time | $595 |
| • 40MB—Seagate 40ms Seek Time Partitioning software included. | $625 |
| • 80MB—Seagate 28ms Seek Time Partitioning software included | $995 |

30-day money-back guarantee.

U.S. 286 IO Motherboard

## United Solutions

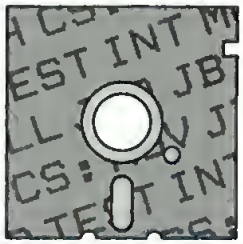
1107 Main Street
Georgetown, Texas 78626

1-800-548-8789
In Texas 512-258-9941

CIRCLE 339 ON READER SERVICE CARD

■ PROGRAMMING/UTILITIES ■ MICHAEL J. MEFFORD

# DRAWING MADE EASY



*A ... panion to last issue's PLAY utility, DRAW.COM frees your artistic creativity from the ... of BASIC and introduces two sophisticated algorithms.*

... ssue's Programming/Utilities ... ing, DRAW, complements the ... Y program I presented last time. ... LAY, DRAW uses almost the same co... and set as the BASIC statement of th... ame name, so if you have already create... some strings for drawing in BASIC, you already know how to use DRAW. If you're not familiar with the DRAW comm...nds, I'll show you how to use them. You'll also be getting a sample drawing to illus...rate what you can do and an example of h...w to use DRAW in batch files.

If you're g... ...g to DRAW anything, however, you ... st have a graphics adapter (CGA or EG... . DRAW will also work with some mon... hrome cards. If you're not sure whether ... u can display graphics, make sure MOD... COM is on your disk and at the DOS p... npt enter the command

```
MODE 40
```

If the character s... widens to reflect the change to a 40-c... n format, you have a suitable displa... change the screen back to 80 colum... enter

```
MODE 80
```

If nothing h... or if the screen went blank when ... red MODE 40, you have a non... adapter. Don't worry—the ma... vs you're still there. However, ... mpting to write to a nonexist... dapter. To restore your screen to ... can blindly enter

```
MODE MON...
```

While this gets your screen display back,

```
                Draw.asm

CODE SEGMENT                                ;*************************
ASSUME CS:CODE,DS:CODE                      ;*                       *
ORG 100H                                    ;*  REMEMBER TO EXE2BIN  *
                                            ;*                       *
START:          JMP     BEGINNING           ;*************************

COPYRIGET       DB      'Copyright 1987 Ziff-Davis Publishing Co.',1AH
PROGRAMMER      DB      'Michael J. Mefford'

FILE            DB      'DRAW.DAT',0
FARA_FLAG       DB      0
FILE_FLAG       DB      0
POLL_KEY        DB      0

X_POSITION      DW      319
Y_POSITION      DW       99
X_BOUNDRY       DW      599
Y_BOUNDRY       EQD     199
X_DIRECTION     DW        ?
Y_DIRECTION     DW        ?
X_TEMP          DW        ?
Y_TEMP          DW        ?
DELTA_X         DW        ?
DELTA_Y         DW        ?
EALF_X          DW        ?
EALF_Y          DW        ?
COUNT           DW        ?
DIRECTION       DW        ?

COLOR           DB        1
DPDATE_FLAG     DB        1
PLOT_FLAG       DB        1

NEW_COLOR       DB        ?
MAX_COLOR       DB        1
BORDER          DB        ?
LEFT_X          DW        ?
RIGHT_X         DW        ?
NEXT_LEFT       DW        ?
NEXT_RIGHT      DW        ?

MONOCHROME      DB        'Draw requires CGA adapter.$'

;-----------------------------------------------------------;
; Exit if attempting to run on a monochrome system.         ;
; Capitalize command line and check for switch characters. ;
;-----------------------------------------------------------;

BEGINNING:      MOV     AX,40H                  ;Point to BIOS data segment.
                MOV     DS,AX
                CMP     DS:[63H],3B4H           ;Is it a monochrome adapter?
                PUSH    CS
                POP     DS
                JNZ     CK_PARAMETERS           ;If no, check parameters.
                MOV     DX,OFFSET MONOCHROME    ;Else, display error message.
                MOV     AH,9
```

*(continues)*

**Figure 1:** *The assembler source code for DRAW.*

## ■ PROGRAMMING/UTILITIES

you still won't be able to use DRAW.

Figure 1 contains the assembly-language listing for DRAW, and Figure 2 is a BASIC program that will create the DRAW.COM file automatically. Easier than keying either of these in, however, is to download DRAW.ASM, DRAW.BAS, and/or DRAW.COM by modem from the PC Magazine Interactive Reader Service, as explained in the sidebar "Downloading DRAW."

**APPROACH THE EASEL** DRAW's three-option syntax is similar to that for PLAY:

```
DRAW [string[/X] | filespec/F[/X]]
```

The first option is to enter DRAW without any additional arguments. DRAW will then attempt to get its commands from a file named DRAW.DAT in the current directory. Like the illustrative data file, CONMEN.DAT, shown in Figure 3 and discussed in the sidebar "Batch File Applications," DRAW.DAT can be created with any ASCII word processor, including *WordStar*'s document mode.

■ DRAW uses almost the same command set as the BASIC statement of the same name. If you're not familiar with the commands, I'll show you how to use them.

The second option is to provide DRAW with a suitable string on the command line. The string can contain any members of DRAW's command set. (The table, "DRAW's Command Set," contains a complete listing and explanation.) Unlike BASIC, DRAW does not require that the string be enclosed in quotes. However, the command line string option may not prove as useful as it is with last month's PLAY.

```
                INT     21H
                INT     20H                     ;And terminate.

CK_PARAMETERS:  CMP     BYTE PTR DS:[80H],0     ;Are there any parameters?
                JZ      PARAMETERS              ;If no, open DRAW.DAT

CAPITALIZE:     MOV     SI,81H                  ;Point to parameters.
NEXT_CAP:       LODSB                           ;Get a byte.
                CMP     AL,13                   ;Is it carriage return?
                JZ      PARAMETERS              ;If yes, done here.
                CMP     AL,'/'                  ;Is it switch character?
                JZ      SWITCHES                ;If yes, check which one.
                CMP     AL,'0'                  ;Is it a possible command?
                JB      NEXT_CAP                ;If no, get next byte.
                MOV     PARA_FLAG,1             ;Else flag that parameter exists.
                CMP     AL,'a'                  ;Is it lower case?
                JB      NEXT_CAP                ;If no, get next byte.
                AND     BYTE PTR [SI-1],5FH     ;Else, capitalize.
                JMP     SHORT NEXT_CAP          ;Next byte.

SWITCHES:       CMP     AL,'/'                  ;Is it switch character?
                JNZ     GET_SWITCH              ;If no, get next byte.
                MOV     BYTE PTR [SI-1],0       ;Else create ASCIIZ for DOS.
GET_SWITCH:     LODSB                           ;Get a byte.
                CMP     AL,13                   ;Is it carriage return?
                JZ      PARAMETERS              ;If yes, done here.
                AND     AL,5FH                  ;Else, capitalize.
                CMP     AL,'E'                  ;Is it /E switch?
                JNZ     CK_FILE                 ;If no, check /F.
                MOV     POLL_KEY,1              ;Else, flag as no keyboard poll.
CK_FILE:        CMP     AL,'F'                  ;Is it /F?
                JNZ     SWITCHES                ;If no, get next byte.
                MOV     FILE_FLAG,1             ;Else, flag as filespec.
                JMP     SHORT SWITCHES          ;Get next byte.

;---------------------------------------------------------------;
; Check to see if parameters exist and if yes check if filespec.  ;
; If yes, read file into buffer and process by stripping Wordstar ;
; high bit, capitalizing, stripping comments and stripping space  ;
; characters and below.  Finish by tacking on a carriage return.  ;
;---------------------------------------------------------------;

PARAMETERS:     CMP     PARA_FLAG,1             ;Are there parameters?
                JZ      FILE_NAME               ;If yes, check if filespec.
                MOV     DX,OFFSET FILE          ;Else, point to DRAW.DAT
                JMP     SHORT OPEN_FILE         ; and open file.

FILE_NAME:      CMP     FILE_FLAG,1             ;Is it a filespec?
                JNZ     READ_COMMAND            ;If no, read the command line.
                MOV     DX,82H                  ;Else, point to filespec.

OPEN_FILE:      MOV     AX,3D00H                ;Open file for reading.
                INT     21H
                JC      EXIT                    ;If not found, exit.

                MOV     BX,AX                   ;Else, filehandle in BX.
                MOV     DX,OFFSET BUFFER        ;Read file into buffer.
                MOV     CX,0F00H
                MOV     AH,3FH
                INT     21H

                MOV     CX,AX                   ;File length in CX.
                MOV     SI,OFFSET BUFFER        ;Initialized SI and DI
                MOV     DI,OFFSET BUFFER        ; to head of buffer.

FORMAT:         LODSB                           ;Get a byte.
                AND     AL,7FH                  ;Strip Wordstar high bit.
                CMP     AL,';'                  ;Is it comment character?
                JZ      STRIP                   ;If yes, strip comment.
                CMP     AL,'a'                  ;Is it lower case?
                JB      CK_CONTROL              ;If no, check space and below.
                AND     AL,5FH                  ;Else, capitalize.
CK_CONTROL:     CMP     AL,32                   ;Is it space or below?
                JBE     NEXT_FORMAT             ;If yes, don't store.
                STOSB                           ;Else store the character.
NEXT_FORMAT:    LOOP    FORMAT                  ;Get next byte.
END_FORMAT:     MOV     BYTE PTR [DI],13        ;Tack on carriage return as EOF.
                MOV     SI,OFFSET BUFFER        ;Point to commands.
                JMP     SHORT GRAPHICS_MODE     ;Change to graphics mode.

NEXT_STRIP:     LODSB                           ;Get a byte.
                AND     AL,7FH                  ;Strip Wordstar high bit.
                CMP     AL,10                   ;Is it linefeed?
                JZ      NEXT_FORMAT             ;If yes get next command.
STRIP:          LOOP    NEXT_STRIP              ;Else, skip and get next byte.
                JMP     SHORT END_FORMAT

;-----------------------------------------------;
```

*(Figure 1 continues)*

# In a world of compatibility, we want to illustrate one small difference.

Price could make a world of difference when you select your compatible PC.

From the $1195 PCX-2 to the $3695 286-based PCA-70 with 70MB of hard disk storage, each of Tandon's nine compatibles delivers the same features and high performance as PCs costing up to 40% more. Not only are Tandons the lowest priced compatibles, they're brought to you by a trusted manufacturer with more than 10 years of experience in the high technology industry.

Tandon Personal Computers. Call toll-free for the dealer nearest you: 1-800-338-4555. In California: 1-800-237-1735. Because if it's all the same to you, our price isn't.

**Tandon**
Price. Selection. Quality.

CIRCLE 135 ON READER SERVICE CARD

William F. Gollan
President

# BCP BUSINESS COMPUTERS OF PETERBOROUGH, INC.

UPPER UNION ST. • PO Box 94 • W. PETERBOROUGH, NH 03468-0094

## "We'll support and.. sell and stand

### PC's • AT's • LAPTOP's

**AST...1 Year**
Premium 286 Products CALL

**Compac...90 Days**
Deskpro 386 16mhz w/40mb 4999.95

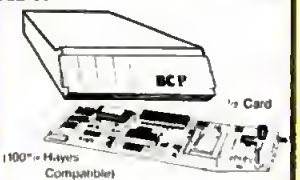
**Sharp...90 Days**
PC 7100 7.37 mhz w/20mb 1939.95

**Toshiba...1 Year**
T-1100 + 7.16mhz (2) 3½'s (New) 1489.95
T-3100 AT 8mhz w/10mb 2689.95

**Wysa...90 Days**
286 10mhz w/40mb 2494.95
286 10mhz w/20mb 2099.95

### MODEMS

**BCP...2 Years**
PG1200 174.95
PG1200 B½ w/sw 119.95
JG2400 279.95



**D.C. Hayes...2 Years**
Smartmodem 1200 365.95
Smartmodem 1200B½ sw 335.95
Smartmodem 2400 565.95
Smartmodem 2400B sw 495.95

**Promathaus...2 Years**
Pro 1200 239.95
Pro 2400 339.95

**US Robotics...2 Years**
Courier 1200 199.95
Courier 2400E 459.95
Courier HST 9600 749.95

**Vantel...2 Years**
1200 + 289.95
1200 ½ Card w/Crosstalk 289.95
2400 ½ Card w/Crosstalk 419.95
2400 + 419.95

### PERIPHERALS

**Alloy...6 Months**
40mb Tape Internal 484.95
60mb Tape External 684.95

**AMDEK...2 Years**
310 Amber 149.95
410 Amber, Graan White (ea) 189.95
Color 600 RGB 379.95
Color 722 EGA 459.95
1280 CAD/Desktop Pub 739.95

**Curtis...LifeTime**
Accessories
Printer Stand 17.95

**Curtis...LifeTima**
Uni System Stand 24.95
Surge Suppressors
Safestrip (6 outlets) 20.95
Diamond (6 outlets) 28.95
Diamond-Plus (Modem & Fax) 40.95
Emerald (6 outlets w/6' cord) 34.95
Ruby (6 outlets, Emi/Rfi, 6' cord) 54.95
Ruby-Plus (Modem & Fax) 84.95

**Disks 10's**
DS/DD (40 TPI)
Verbatim 14.95
Maxell MD-2 19.95
DS/High Density (96 TPI)
Fuji 26.95
Verbatim 28.95
Maxell 33.95
3½" DS/DD (720k)
Fuji 25.95
Maxell 25.95
Verbatim 25.95

**Fifth...1 Year**
Logical Connection w/256k 299.95

**Floppy Drives...90 Days**
Toshiba PC 5.25" 360kb 99.95
Toshiba AT 5.25" 360kb 99.95
Toshiba 3.5" 149.95

**Hayes...90 Days**
MACH III Joy w/Fire 39.95
MACH IV Joy 79.95

**Herculas...1 Year**
Color 158.95
Graphic's + 189.95
In Color 18 299.95

**Iomaga...90 Days**
Bernoulli 10mb (3 pac) 169.95
Bernoulli 20mb (3 pac) 239.95

**Kensington...90 Days**
Master Piece Remota 119.95
Mastar Placa + 124.95
Mastar Pieca 94.95

**Mamory**
64k & 256K (9) CALL

**Mice**
BUS
Microsoft V6.0 w/Show P 118.95
Mouse Systems w/Pc P 126.95
RS-232C
Microsoft V6.0 w/Show P. 128.95
Mouse Systems w/Pc P 128.95
Mouse Systems w/Pc P & Ready 148.95
IMSI w/Dr Hallo II 134.95

**NEC...6 Months**
EGA-PGA (GB-1) 359.95
Multisync 1401 579.95
Combo 1401 & GB-1 919.95

**NSI Logic...3 Years**
Smart EGA w/256k 294.95

**Orchid...90 Days**
PC Turbo 286E w/1mb 699.95
Tiny Turbo 286 409.95
EGA Turbo w/256k 549.95
Jr. 386 879.95

**Paradisa...1 Year**
Autoswitch EGA-480 369.95

**Pius...1 Year**
Hard Card 20mb 49mls 659.95

**Priam...1 Yaar**
40mb AT 28ms 749.95
60mb AT 28ms 989.95

**Princaton...1 Year**
Max 12E 174.95
HX 12 429.95
HX 12 E 499.95
LM 300 WYSIWYG w/Int 1219.95
LS-300 Scanner 899.95

**Quadram...1 Year**
EGA + 309.95
Prosync 389.95

**Quadram...1 Year**
Microfazer II w/512k 309.95

**Saagata...1 Year**
20mb w/Cont. ½ ht 389.95
30mb w/Cont. ½ ht 479.95

**Vidao-7...2 Years**
Vega EGA 299.95
Vega EGA Daluxe 389.95

### DOT MTX. & LQ PRINTERS

**ALPS...1 Year**
ALO 300 Color 15" (240 cps) 799.95
P2100 18" (400 cps) 1229.95

**Fujitsu...1 Year**
DX2100 10" (220 cps) 389.95
DX2400 15" (360 cps) 799.95
DL2400 Color 15" (360 cps) 959.95
DL2600 15" (288 cps) 1089.95
DL2600 Color 15" (288 cps) 1349.95

**IBM...90 Days**
New Printers CALL
Proprintar 10" (220 cps) 379.95
Proprintar XL 15" (220 cps) 549.95
Quietwriter I 10" (60 cps) 889.95
Quietwriter II 10" (60 cps) 1039.95

**NEC...1 Year**
P560XL Color 15" (290 cps) 969.95
P660 10" (216 cps) 469.95
P760 15" (216 cps) 639.95
P960 XL 15" (400cps) 1239.95

**Nissho...90 Days**
NP-2410 15" (540 cps) 1389.95

**Okidata...1 Year**
192+ 10" (200 cps) 359.95
193+ 15" (200 cps) 529.95
292a 10" (240 cps) 509.95
293e 15" (240 cps) 649.95

**Toshiba...1 Year**
P321 SL 10" (New) CALL
P351 Color 15" (300 cps) 1039.95

### LASER PRINTERS

**CIE...90 Days**
LIPS 10 (10 ppm) 2599.95
LIPS 10+ (New) CALL

**Citizan**
Overture 110 (10 ppm) 1899.95

**DataProducts...90 Days**
LZR 1230 (12ppm) 2599.95

**Hawlatt Packard...1 Year**
Laser Jet Series II (8 ppm) 1999.95

**Okidata...90 Days**
Laserline 6 (6 ppm) 1499.95

**Quadram...90 Days**
QuadLaser 1101 (8 ppm) 3349.95

**T.I....90 Days**
PostScript 2108 (8 ppm) 4999.95
PostScript 2115 (15 ppm) 6499.95

### BUSINESS SOFTWARE

**Ashton-Tate...NCP**
d Base III + V 1.10 399.95
Framework II V 1.10 399.95

**Ashton-Tate...NCP**
Multimate V3.31 239.95
Multimate Advantage V3.6 309.95
Rapid File V 1.0 249.95

**BPI...NCP**
AR/GL/AP/PR (ea) 179.95

**Broderbund...CP**
Bank Street Writer + 84.95
For Command 129.95

**Computer Associates...NCP**
Spreadsheet Auditor V 3.0 88.95
SuperCalc 4 V 1.1 279.95
Super Project + 279.95

**Compusarva...NCP**
Subscription Kit 24.95

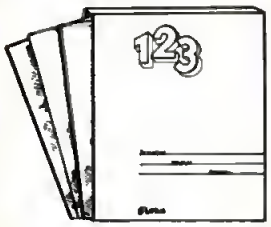
**DAC**
DAC Easy Accounting 44.95
DAC Easy Base 31.95
DAC Easy Mate 25.95
DAC Easy Payroll 31.95
DAC Easy Port 18.95

**IBM**
Displaywriter IV 339.95

**Innovative...NCP**
SmartSystem V3.1 444.95
Spell Checker 84.95

**Lifatrea...NCP**
Volkswriter Deluxe + 68.95
Volkswriter III V 2.2 148.95
Words & Figures V 1.01 128.95

**Lotus...CP**




HAL 119.95
Lotus 1-2-3 V 2.01 319.95
Lotus Report Writer 119.95
Manuscript V1.0 349.95
Mairo 89.95
Symphony V 1.20 444.95

**Maca**
Maca Utilities CALL

**Maca...CP**
Mng Your $ V 3.0 114.95
Mng the Market V 1.0 84.95

**Microrim...NCP**
R Base 5000 V 1.01 254.95
R Base 5000 RunTime V 1.01 234.95
R Base 5000 Graphics 159.95
R Base System V 1.00 354.95

**Microsoft...NCP**
Project V 3.0 234.95
Multiplan V 3.30 118.95
Windows V 1.03 84.95
Word V 3.1 269.95

**Migant**
Ability V 1.0 84.95

**Monogram...NCP**
$ & Cents V 2.0 105.95

**Micropro...NCP**
Wordstar Pro V 4.0 249.95
Wordstar 2000+ V 2.0 264.95

**Office Solutions...NCP**
Office Writer V 5.0 244.95

**Paper Back...CP**
VP Planner V 1.3 56.95
VP Info V 1.0 56.95

MasterCard

## CALL TODAY—ORDERS ONLY 1-800-845-3003

Copyrighted

## PostScript Lasers Available Today!

| | |
|---|---|
| T.I 2108 (8 ppm) | 4999.95 |
| T.I 2115 (15 ppm) | 6499.95 |

**DESKTOP PUBLISHING COMPLETE SYSTEM 7495.95**

- Wyse 286 w/40mb
- NEC Multisync
- NEC GBI EGA/MDA
- CIE Lips 10+
- Xerox Ventura Publishing
- 4 Hours Free Phone Support

# warranty every product we behind it 100%."

### Paper Back...CP
VP Expert V 1.0 58.95

### Sierra...CP
Smart Money V 1.0 49.95

### Simon Schuster...NCP
Websters Speller V 1.3 38.95
Websters Thesarus V 1.0 42.95
Websters Writer V 1.01 108.95

### Software Group...NCP
Enable V 1.1 339.95

### Software Publishing...NCP
Harvard Total PM V 2.0 339.95
PFS 1st Choice V1.0 108.95
PFS.Pro File 148.95
PFS Pro Write V 1.0 118.95

### Word Perfect...NCP
Word Perfect V 4.2 229.95
Word Perfect Library 58.95

## PUBLISH. • GRAPH. • CAD

### Aldue...NCP
PageMaker CALL

### Applied...NCP
Pizazz V 1.01 34.95

### Ashton Tate...NCP
Chart Master V6.2 228.95
Diagrem Master V5.01 198.95
Map Master V6.0 238.95
Sign Master V5.1 148.95

### Broderbund...CP
Print Shop 34.95
Print Shop Companion 32.95
Librays #1, #2 (ea) 22.95
Toy Shop 41.95

### Brown Wagh
Print 189.95

### DRI...CP
Gem Draw + 179.95

### Generic...NCP
Auto Dimensioning 34.95
CADD V 2.0 68.95
CADD V 2.0 Combo 114.95
Dot Plot 17.95

### Lotus/Graphics Com...CP
Freelance V Plus 329.95
GraphWriter Combo V 4.3 319.95

### Microsoft...NCP
Chart V2.02 188.95

### New Englend...CP
Graph-in-the-Box 54.95

### Software Publishing...NCP
Harvard Pres. Graphics 235.95
Harvard Pro Publisher 459.95
Personal Publisher V 1.0 108.95

### SpringBoard...CP
Certificate Maker 33.95
Clip Art V1 19.95
Clip Art V2 24.95
Newsroom Pro 78.95

### Xerox
Ventura Publishing V 1.0 679.95

### Z • Soft
PC Paintbrush V 3.0 59.95
Publishers Paintbrush CALL

## UTILITIES/LANGUAGES

### Borland...NCP
Reflex Bundle 124.95
Reflex DBMS V 1.1 86.95
Reflex Workshop V 1.0 40.95
Sidekick V 1.5 50.95
Superkey V 1.1 44.95
Traveling Sidekick 42.95
Traveling Sidekick w/sk 72.95
Turbo Lightning V 1.0 58.95

### Borland...NCP
Turbo Lightning w/WW 89.95
Turbo Pascal V 3.0 58.95
Turbo Pascal w/Turbo T. 74.95
Turbo Prolog V 1.1 58.95
Turbo Prolog Tool Box 58.95
Turbo Tool Box DB V 1.2 40.95
Turbo Tool Box Editor V 1.0 40.95
Turbo Tutor V 2.0 23.95
Turbo Game Wks. 40.95
Turbo Graphics V 1.0 40.95
Turbo Jumbo Pack 168.95
Turbo Newpak 51.95
Turbo Basic V 1.0 58.95
Turbo Pascal Numerical Tool 60.95
Turbo C V 1.0 59.95
Sprint CALL
Eureka The Solver V 1.0 58.95
Word Wizard V 1.1 40.95

### Centrel Point...NCP
Copy II PC 24.95
Option Board 79.95
PC Tools 24.95

### Executive...NCP
Hot V3.0 40.95
XTree V2.0 33.95

### Fifth...NCP
Fast Back V 5.53 88.95

### Fox & Geller...NCP
dGraph III 124.95
dUtility III + 79.95
Quick Code III + 149.95
Quick Index III 79.95
Quick Report III 149.95
r Graph III 109.95

### Funk...NCP
Sideways V 3.11 38.95

### Lifeboet
Advantage C++ V1.10 469.95
Tima Slicer V3.01 209.95

### Mark Williams
Let's C 44.95

### Meriden...CP
Carbon Copy 124.95

### Microsoft...NCP
Basic Compiler V5.38 244.95
Cobol Compiler V2.10 429.95
C Compiler V4.00 274.95
Fortrem Compiler V4.00 269.95
Macro Assembler V4.00 96.95
Quick Basic V2.01 64.95

### Microetuff...NCP
Crosstalk Mark IV 134.95
Crosstalk XVI V3.61 94.95
Remote V 1.3 94.95

### Nantucket...NCP
Clipper August 86' 344.95

### Norton...NCP
Norton Commander V 1.0 39.95
Norton Util. V 4.04 54.95
Nortol Util Advanced 79.95

### Personics...NCP
Smart Notes V1.40 48.95

### Quarterdeck...NCP
Deskview V 1.3 64.95

### Soft Logic...NCP
Cubit 34.95
Disk Optimizer V2.0 34.95
Double DOS V4.0 34.95
Software Carousel V2.0 34.95

### Summit...NCP
Better Basic V2.1 109.95
Better Basic 8087 or Btrieve (ea) 59.95

### True Basic...NCP
True Basic V2.0 104.95
True Basic Libraries (ea) 31.95

# BCP Monthly Specials!

## Intel...5 Years

| AboveBoerd | | Meth Co-Processors | |
|---|---|---|---|
| • PC w/2mb | 399.95 | • 8087 5mhz | 114.95 |
| • PCPS C/S/P w/1.5mb | 409.95 | • 8087-2 8mhz | 159.95 |
| • AT w/2mb | 519.95 | • 80287 6mhz | 189.95 |
| • AT w/4mb | 899.95 | • 80287-8 8mhz | 244.95 |
| • ATPS S/P w/1.5mb | 519.95 | • 80287-10 10mhz | 299.95 |
| • ATPS S/P w/3.5mb | 899.95 | | |

## AST...2 Years

| Premium's | | Rampege's | |
|---|---|---|---|
| • PC 6Pac C/S/P w/1mb | 299.95 | • PC w/2mb | 429.95 |
| • PC 6Pac C/S/P w/2mb | 549.95 | • AT w/2mb | 559.95 |
| • AT Adv. P/S w/2mb | 779.95 | | |

## TallTree...2 Years

| JRAM | | | |
|---|---|---|---|
| • II PC w/2mb | 319.95 | • III AT w/2mb | 409.95 |
| • III PC w/2mb | 369.95 | JLeeer + | |
| • II AT w/2mb | 369.95 | • PC w/2mb | 899.95 |
| | | • AT w/2mb | 799.95 |

**Customer Service (603) 924-9406**

**OUR TERMS**

Payment MC/Visa no surcharge
MC/Visa cashiers MO's processed in 24 hrs
No sales tax
Corporate & Institutional PO's accepted subject to approval
Shipping
Monitors, Printers (non Lasers) Drives Add 2%
Laser Printers Federal Express Only FOB N.H
Computers FOB N.H
Hawaii FOB N.H
Alaska & outside Continental USA CALL
Misc
Prices & availability subject to change
This ad supercedes all previous ads
Not responsible for typo errors

**CALL TODAY—ORDERS ONLY 1-800-845-3003** VISA

## ■ PROGRAMMING/UTILITIES

```
EXIT:           INT 20H                 ;Terminate.

;-----------------------------------------------;

;---------------------------;
; Change to grephics mode. ;
;---------------------------;

READ_COMMAND:   MOV     SI,82H                  ;Initielize pointer to commends.

GRAPBICS_MODR:  CMP     BYTE PTR [SI],'X'       ;Low resolution commend?
                JNZ     HIGH_RES                ;If no, high resolution.
                INC     SI                      ;Else, bump pointer past "X".
                PUSH    SI                      ;Seve pointer.
                MOV     AX,4                    ;Chenge to 320X200 color.
                INT     10H
                MOV     X_POSITION,159          ;Chenge center position.
                MOV     X_BOUNDRY,319           ;Chenge boundry.
                MOV     COLOR,3                 ;Chenge defeult color.
                MOV     MAX_COLOR,3
                CALL    CK_NUMBER               ;Get palette.
                MOV     BX,1
                MOV     AH,0BH                  ;Select palette.
                INT     10H
                POP     SI                      ;INT 10h does not preserve SI.
                JMP     SHORT NEXT_COMMAND      ;Get commands.

HIGH_RES:       MOV     AX,6                    ;640X200 BW.
                PUSH    SI                      ;Preserve SI.
                INT     10H
                POP     SI

;-------------------------------;
; This is the commend processor. ;
;-------------------------------;

NEXT_COMMAND:   CMP     POLL_KEY,1              ;Should we poll keyboerd?
                JZ      GET_COMMAND             ;If no, skip.
                MOV     AH,1                    ;Else, check for keystroke
                INT     16H                     ; via BIOS.
                JNZ     EXIT                    ;If keystroke, exit.
GET_COMMAND:    LODSB                           ;Else, get a byte.
                CMP     AL,13                   ;Is it carriege return?
                JBE     EXIT                    ;If yes, we are done.
                CMP     AL,32                   ;Is it space, comma or semicolon?
                JZ      NEXT_COMMAND            ;If yes, skip.
                CMP     AL,','
                JZ      NEXT_COMMAND
                CMP     AL,';'
                JZ      NEXT_COMMAND

CK_U:           CMP     AL,'U'                  ;Is it "U" ?
                JNZ     CK_D                    ;If no, check "D".
                MOV     X_DIRECTION,0
                MOV     Y_DIRECTION,-1          ;Else, up one.
                JMP     DRAW_COMMAND

CK_D:           CMP     AL,'D'                  ;Is it "D" ?
                JNZ     CK_L                    ;If no, check "L".
                MOV     X_DIRECTION,0
                MOV     Y_DIRECTION,1           ;Else, down one.
                JMP     DRAW_COMMAND

CK_L:           CMP     AL,'L'                  ;Is it "L" ?
                JNZ     CK_R                    ;If no, check "R".
                MOV     X_DIRECTION,-1          ;Else left one.
                MOV     Y_DIRECTION,0
                JMP     DRAW_COMMAND

CK_R:           CMP     AL,'R'                  ;Is it "R" ?
                JNZ     CK_E                    ;If no, check "E".
                MOV     X_DIRECTION,1           ;Else, right one.
                MOV     Y_DIRECTION,0
                JMP     DRAW_COMMAND

CK_E:           CMP     AL,'E'                  ;Is it "E" ?
                JNZ     CK_F                    ;If no, check "F".
                MOV     X_DIRECTION,1           ;Else, right one.
                MOV     Y_DIRECTION,-1          ;Up one.
                JMP     SHORT DRAW_COMMAND

CK_F:           CMP     AL,'F'                  ;Is it "F" ?
                JNZ     CK_G                    ;If no, check "G".
                MOV     X_DIRECTION,1           ;Else, right one.
                MOV     Y_DIRECTION,1           ;Down one.
                JMP     SHORT DRAW_COMMAND

CK_G:           CMP     AL,'G'                  ;Is it "G" ?
```

*(Figure 1 continues)*

You might use the string option to try out short individual command strings before combining them with lengthy and more-useful data file strings. Here's an example of a command line string so you can get the feel of how DRAW works. Enter

```
DRAW "X0 C2 BU50 M+40,70 L80 M+40,-70 BD5 P2,2"
```

This will create a red triangle in the middle of your screen. The X chooses the low-resolution (320 by 200) color graphics mode, and the 0 selects palette zero. If an X is not found as the very first command in the string, DRAW defaults to the one-color high-resolution screen (640 by 200). C2 changes the color to red. B (blank) indicates that the next move will not draw, but will simply update the current coordinates.

■ To stay consistent with BASIC's commands, the familiar Cartesian coordinates have been changed a bit. Minus is up and plus is down.

It might help if you think of the current coordinates as a cursor position. Upon entry, DRAW starts in the middle of the screen. The BU50 centers the triangle by changing the starting position (159,99), up 50 units to the apex of the triangle (159,49).

The first line drawn is a relative diagonal move, plus 40 to the right and 70 units down (M+40,70). The sign located in front of the *x* axis tells DRAW that the move is relative rather than absolute. If the sign were omitted, DRAW would then move to the actual *x*,*y* coordinates of 40,70 rather than our intended move, which is relative to the last position.

Note that to stay consistent with BASIC's commands, the familiar Cartesian coordinates have been changed a bit. The *x* direction is the expected minus to the left and plus to the right, but the *y* direction is

# CAREFUL–YOU'RE ABOUT TO LOSE YOUR AMATEUR STATUS.

Now even novices can make their PC's do things that the experts had to strain at.

By slipping Ability Plus™ or Ability™ into their PC's.

With both programs, you get full-featured word processing. Spreadsheets larger than Symphony and the ability to import Lotus 1-2-3 1A files. A forms-oriented database with Ability and a relational database with Ability Plus. Professional business graphics with just a few keystrokes. Menu-driven Migent Pocket Modem™ and Hayes-compatible communications.
Even "slide shows" on your PC!

They both use menus and the same commands in all the applications, so there's no programming.

And they're the only integrated business programs that work with "live" data, not just copies pasted in. So you only have to enter data once, and changes you make in one application are automatically made for you in *all* your linked applications.

Perfect for those endless daily, weekly and monthly reports.

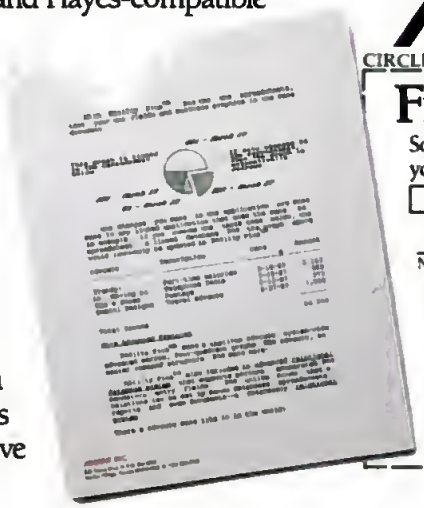
Ability Plus, our latest addition, adds a spelling checker, system-wide advanced macros, four-quadrant X-Y graphs, EGA support and much more. And it's a fully relational *system* that can look up information for you from any application. (Enter a name, it gets the phone number; enter a part number, it gets the description; etc.).

With all this, Ability Plus is just $199 while Ability is budget-priced at $99 (upgrades available).

If it sounds too good to be true, use the coupon to get your free demo disk.

Or call 800-633-3444 and start doing more and working less today.

Whether you're a computer expert or would just like to be one.



MIGENT™

CIRCLE 383 ON READER SERVICE CARD

## Free Demos!

Sounds great! Please send the name of your nearest dealer and a demo disk for:

☐ Ability™ ☐ Ability Plus™

Name

Address

City State Zip

Phone

Send to: Migent, Inc., 865 Tahoe Blvd., Call Box 6, Incline Village, Nevada 89450-6062

©Migent, Inc 1987 Ability Ability Plus and Pocket Modem are trademarks of Migent, Inc

# DOWNLOADING DRAW

The programs that appear in our Programming/Utilities column (as well as other programs we publish) can be downloaded by modem from the PC Magazine Interactive Reader Service. There is no charge for this service, but users are cautioned that these programs are copyright material and are made available only for individual, noncommercial use. You may make copies for others (including placement on noncommercial electronic bulletin boards),

*(continues)*

## DRAW AT A GLANCE

The syntax for DRAW.COM is

```
DRAW [string[/X] | filespec/P[/K]]
```

Operation:
DRAW.COM is designed to provide CGA-resolution (320 by 200) drawing capabilities on a color, an enhanced color, or (with some MGA boards) a monochrome display, without the need to work in BASIC. If entered without additional parameters, DRAW.COM will search out and execute the commands contained in a file named DRAW.DAT, located in the current directory. The commands to which DRAW.COM responds are listed in the table, "DRAW's Command Set," and are to some degree similar to those used by the BASIC DRAW statement.

DRAW can also be entered with a string of commands (for a very simple graphic) or with the name of a file consisting of commands. Any legal DOS filename may be used, and full path support is provided, but a /F must be appended to the filename. An optional /K may be added to prevent a keystroke from halting execution.

```
                JNZ     CK_N                    ;If no, check "H".
                MOV     X_DIRECTIDN,-1          ;Elaa, left one.
                MOV     Y_DIRECTION,1           ;Down one.
                JNP     SHDRT DRAW_CONMAND

CK_H:           CMP     AL,'H'                  ;Ie it "B" ?
                JNZ     CK_B                    ;If no, check "B".
                MOV     X_DIRECTION,-1          ;Elee left one.
                MOV     Y_DIRECTION,-1          ;Up one.
                JMP     SHORT DRAW_COMMAND

CK_B:           CMP     AL,'B'                  ;Ie it "B" ?
                JNZ     CK_N                    ;If no, chack "N".
                MOV     PLOT_PLAG,0             ;Elaa, flag no plotting.
                JNP     SHORT COMMAND_END

CK_N:           CMP     AL,'N'                  ;Ie it "N" ?
                JNZ     CK_C                    ;If no, check "C".
                MOV     UPDATE_PLAG,0           ;Elee, fleg no updete.
                JNP     SHORT COMMAND_END

CK_C:           CMP     AL,'C'                  ;Ie it "C" ?
                JNZ     CK_S                    ;If no, chack "S".
                CALL    CK_NUMBER               ;Else, get color.
                MOV     COLDR,AL                ;And etora.
                JNP     SNORT COMMAND_END

CK_S:           CMP     AL,'S'                  ;Ie it "S" ?
                JNZ     CK_M                    ;If no, chack "M".
                CALL    CLS
                JNP     SHORT COMMAND_END

CK_N:           CMP     AL,'N'                  ;Ie it "M" ?
                JNZ     CK_P                    ;If no, check "P".
                CALL    MOVE                    ;Elee, move coordinatee.
                JNP     SHORT COMMAND_END

CK_P:           CMP     AL,'P'                  ;Ie it "P" ?
                JNZ     CK_K                    ;If no, check "K".
                CALL    PAINT                   ;Elee, peint.
                JMP     SHORT COMMAND_END

CK_K:           CMP     AL,'K'                  ;Ie it "K" ?
                JNZ     CONMAND_END             ;If no, gat nest commend.
                MOV     POLL_KEY,1              ;Elee, flag ae no key poll.
                JNP     SHORT COMMAND_END

DRAW_COMMAND:   CALL    DRAW                    ;Drew tha dot.
                CALL    UPDATE_END              ;Restore coordinatee if needed.
COMMAND_END:    JNP     NEXT_COMMAND            ;Get next command.

                ;*************;
                ; Subroutines ;
                ;*************;

;-----------------------------------------------------;
; Thie eubroutine drewe e dot if updata fleg ie not set. ;
; Dtherwise, just the coordinatee ere chenged.          ;
;-----------------------------------------------------;

DRAW:           CALL    CK_PLOT                 ;Chack to sea if drawing.
                CALL    CK_NUMBER               ;Gat unite to move.
                CNP     AX,0                    ;If aero, ezit.
                JZ      END_DRAW
                CALL    UPDATE_START            ;Chack if non-update.

NEXT_DRAW:      MOV     CX,X_DIRECTION          ;Add X direction.
                ADD     CX,K_POSITION
                CNP     CX,0                    ;Check boundriee.
                JB      END_DRAW

UPPER_X:        CNP     CX,X_BOUNDRY
                JA      END_DRAW
STORE_X:        NOV     X_POSITION,CX           ;Store new X position.

                MOV     DX,Y_DIRECTIDN          ;Add Y diraction.
                ADD     DX,Y_POSITION
                CMP     DX,0                    ;Chack boundriee.
                JB      END_DRAW

UPPER_Y:        CNP     DX,Y_BOUNDRY
                JA      END_DRAW
STORE_Y:        MOV     Y_POSITION,DX           ;Store new Y poeition

                CMP     PLOT_PLAG,1             ;Ie it e blenk move.
                JNZ     LOOP_DRAW               ;If yee, ekip drew.

PLOT:           MOV     AL,COLOR                ;Else, color in AL.
                MOV     AH,0CH                  ;Write dot.
```

*(Figure 1 continues)*

```
                INT     10H

LOOP_DRAW:      DEC     BX                      ;Drew ell unite?
                JNZ     NEXT_DRAW               ;If no, draw next.
END_DRAW:       RET                             ;Elee, return.

;-------------------------------------------------------------;
; Thie eubroutine movse the X,Y coordinatee eithsr to new ebsoluts ;
; coordinates or reletively eccording to Breeenham'e Algorithm.    ;
;-------------------------------------------------------------;

MOVE:           CALL    CK_SIGN                 ;Ie it prefeced with +/- ?
                JNC     DO_ABSOLUTE             ;If no, sbsoluts move.
                MOV     X_DIRECTIDN,1           ;Elee, essume poeitive.
                CMP     BP,2                    ;Ie it positive move?
                JNZ     STORE_X1                ;If yse, etors.
                MOV     X_DIRECTION,-1          ;Elee, negetive direction.
                NEG     AX                      ;Negste units.

STORE_X1:       MOV     DELTA_X,AX              ;Store unite.
                INC     SI                      ;Bump pointer paet comme.
                CALL    CK_BIGN                 ;Do the same for ths Y direction.
                MOV     Y_DIRECTIDN,1
                CMP     SP,2
                JNZ     STORE_Y1
                MOV     Y_DIRECT.ON,-1
                NEG     AX
STORE_Y1:       MOV     DELTA_Y,AX
                JMP     SHORT CK_SLOPE          ;Plot tbe slope.

DO_ABSOLUTE:    SUB     AX,X_POSITIDN           ;Terget X - current poeition.
                MOV     X_DIRECTIDN,1           ;Assume poeitive.
                JGE     STORE_X2                ;Is it poeitive?
                MOV     X_DIRECTIDN,-1          ;If no, negetive direction.
                NEG     AX                      ;Negste unite.
STORE_X2:       MOV     DELTA_X,AX              ;Store units.
                INC     SI                      ;Bump pointer paet comme.
                CALL    CK_SIGN                 ;Do ths same for Y direction.
                SUB     AX,Y_POSITIDN
                MOV     Y_DIRECTIDN,1
                JGE     STORE_Y2
                MOV     Y_DIRECTIDN,-1
                NEG     AX
STORE_Y2:       MOV     DELTA_Y,AX

CK_SLOPE:       CALL    CK_PLOT                 ;Check if drewing dots.
                CALL    UPDATE_START            ;Check if updsting poeition.
                MOV     AX,DELTA_X
                CMP     AX,DELTA_Y              ;Ie elope steep?
                JL      GOT_STEEP               ;If yee, do stesp slgorithm.
                CALL    EASY                    ;Elee, do easy elgorithm.
                JMP     SHORT MOVE_END
GOT_STEEP:      CALL    STEEP
MOVE_END:       CALL    UPDATE_END              ;Check if no updete.
                RET

;-------------------------------------------------------------;
; Thie ie Bresenham's Algorithm for drewing e line with elope < 1. ;
;-------------------------------------------------------------;

EASY:           MOV     AX,DELTA_X              ;Get units to plot.
                MOV     COUNT,AX                ;Store in count.
                INC     COUNT                   ;Adjuet for initial plot.
                SHR     AX,1                    ;Divide unite by two.
                MOV     HALF_X,AX               ;Store.
                MOV     HALF_Y,0                ;Initieliza half Y.
                MOV     AX,Y_DIRECTIDN          ;Retrieve Y direction.
                MOV     DIRECTIDN,AX            ;Store.
                JMP     SHORT EASY1             ;Alreedy plotted first dot.

NEXT_EASY:      MOV     BX,1                    ;Dne unit to draw.
                CALL    NEXT_DRAW               ;Draw it.
EASY1:          MOV     Y_DIRECTION,0           ;Assums no sddition.
                MOV     AX,DELTA_Y              ;Add to delte Y to half Y.
                ADD     AX,HALF_Y
                MOV     HALF_Y,AX               ;Store.
                CMP     AX,HALF_X               ;Ie > = helf X?
                JLE     LOOP_EASY               ;If no, don't change Y yet.

                SUB     AX,DELTA_X              ;Blee, updete helf Y
                MOV     HALF_Y,AX
                MOV     AX,DIRECTIDN
                MOV     Y_DIRECTION,AX          ;Reetore Y direction.

LOOP_EASY:      DEC     COUNT                   ;Done ell unite?
                JNZ     NEXT_EASY               ;If no, do next.
                RET

;-------------------------------------------------------------;
```

*(Figure 1 continues)*

*("Downloading DRAW" continued)*

as long as no charge is involved. However, making copies for any commercial purpose is strictly prohibited.

The modem number for PC-IRS is (212) 696-0360. Set your modem and communications software to use 1200 (or 300) bps, 8 data bits, 1 stop bit, no parity. PC-IRS files with a .COM, .EXE, or .ARC extension require that you also use the Xmodem error-checking protocol; our other files (e.g., with extensions of .ASM or .BAS) can be downloaded using either regular ASCII or Xmodem transmission.

DRAW.BAS, whether typed in from the magazine at your keyboard or downloaded from PC-IRS, will automatically create DRAW.COM when run once in BASIC. DRAW.ASM, also listed both here and on PC-IRS, allows you to modify the program but requires you to use a macro assembler (IBM or Microsoft) and the following commands:

```
MASM DRAW;
LINK DRAW;
EXE2BIN DRAW DRAW.COM
```

the opposite: minus is up and plus is down.

The next move in this example is a simple move of 80 units to the left (L80). The triangle is completed by returning to the apex with a move 40 units in the plus direction and 70 units, this time in the minus direction (M+40,−70). The triangle is then colored red by first moving into its interior with a BD5 (blank down 5), followed by P2,2 (paint the color red until a red border is encountered).

You will notice that DRAW returns you to the DOS prompt in the 40-column color mode. To return to standard 80-column mode, enter the DOS command MODE 80 at the prompt.

The third DRAW option is to give DRAW a data filename that contains the commands. Any DOS filespec can be used, including paths, but the filename must be immediately followed by a /F to distinguish the filename from a command string. (If DRAW doesn't do what you think it should have, you probably forgot the /F.) If you've entered (or downloaded) the sample file CONMEN.DAT shown in

## ■ PROGRAMMING/UTILITIES

```
; This is Brassnham's Algorithm for drawing a line with slope > = 1. ;
;-------------------------------------------------------------------;

STEEP:          MOV     AX,DELTA_Y              ;Get units to plot.
                MOV     COUNT,AX
                INC     COUNT
                SHR     AX,1
                MOV     HALF_Y,AX               ;Store.
                MOV     HALF_X,0                ;Initialize half X.
                MOV     AX,X_DIRECTION          ;Retrieve X direction.
                MOV     DIRECTION,AX
                JMP     SHORT STEEP1

NEXT_STEEP:     MOV     BX,1
                CALL    NEXT_DRAW
STEEP1:         MOV     X_DIRECTION,0           ;Assume no addition.
                MOV     AX,DELTA_X              ;Add delta X to half X.
                ADD     AX,HALF_X
                MOV     HALF_X,AX
                CMP     AX,HALF_Y               ;Is it > = half Y?
                JLE     LOOP_STEEP              ;If no, don't change X yet.

                SUB     AX,DELTA_Y              ;Else, update half X.
                MOV     HALF_X,AX
                MOV     AX,DIRECTION
                MOV     X_DIRECTION,AX          ;Restore X direction.
LOOP_STEEP:     DEC     COUNT                   ;Done all units?
                JNZ     NEXT_STEEP              ;If no, do next.
                RET

;-----------------------------------------;
; This subroutine checks for signed moves. ;
;-----------------------------------------;

CK_SIGN:        XOR     BP,BP                   ;Use BP for flag.
                CMP     BYTE PTR [SI],'+'       ;Plus sign?
                JNZ     CK_MINUS                ;If no, check minus sign.
                INC     SI                      ;Else bump pointer to next byte.
                MOV     BP,1                    ;Flag as positive, relative move.
                JMP     SHORT GET_NUMBER        ;Get the number.

CK_MINUS:       CMP     BYTE PTR [SI],'-'       ;Is it minus?
                JNZ     GET_NUMBER              ;If no, get number.
                INC     SI                      ;Else bump pointer to next byte.
                MOV     BP,2                    ;Flag as negative, relative move.

GET_NUMBER:     CALL    CK_NUMBER               ;Get the number.
                CMP     BP,2                    ;Is it minus?
                JNZ     CK_ABSOLUTE             ;If no check if absolute.
                NEG     AX                      ;Else, negate number.
CK_ABSOLUTE:    CMP     BP,0                    ;Was it signed?
                JNZ     RELATIVE                ;If yes, relative move.
                CLC                             ;Else, flag as absolute move.
                RET

RELATIVE:       STC                             ;Flag a relative move.
                RET

;---------------------------------------------------;
; This subroutine draws the first dot before moving. ;
;---------------------------------------------------;

CK_PLOT:        CMP     PLOT_FLAG,1             ;Is it a blank move?
                JNZ     END_PLOT                ;If yes, skip.
                MOV     DX,Y_POSITION
                MOV     CX,X_POSITION
                MOV     AL,COLOR
                MOV     AH,0CH                  ;Else, draw dot.
                INT     10H
END_PLOT:       RET

;-------------------------------------------------------;
; These two subroutines store and, when done drawing,    ;
; restore the current position if it is a no update draw. ;
;-------------------------------------------------------;

UPDATE_START:   CMP     UPDATE_FLAG,1           ;Are we to update postion?
                JZ      RET_START               ;If yes, skip.
                MOV     AX,X_POSITION           ;Else, store.
```

*(Figure 1 continues)*

Figure 3, you would use it by entering

```
DRAW CONMEN.DAT/F
```

The vertical bar in the syntax description means you can give DRAW a string or a filename, but not both in one command. The /K option causes DRAW to ignore the keyboard. It can be used with either a string or a filename to prevent a keystroke from terminating the program. If you use

### DRAW's Command Set

**X*n*** Change to low-resolution 320 by 200 color graphics.

If X is not found, the default is 640 by 200 high-resolution black-and-white graphics. X must be the first character of the command line or the first character in a file.

The palette will be changed to *n*, where *n* can be either zero or one. See C (color) command below for the color of each palette.

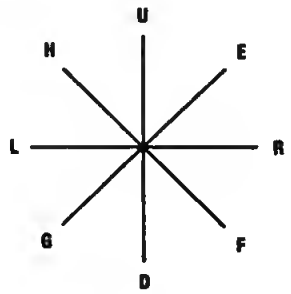
**K** Do not poll the keyboard while drawing. If K is not found, any keystroke terminates the program.

**S*n*** Flood the screen color to pattern *n*. *n* must be a decimal number in the range 0–255, and represents an 8-bit pattern. Normally this command is issued immediately after the X command (if present) to clear the screen with a background color other than black. For example, to clear to color red (2) in low resolution, the command is S170 (binary 10101010).

| color | 320 by 200 | 640 by 200 |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 85 | 255 |
| 2 | 170 | no choice |
| 3 | 255 | no choice |

Pattern colors may also be used. For example, a pattern of half green and half black would be S58 (binary 01000100). In high resolution, each bit represents a dot, eight dots per byte. This is why only two colors (black or white) are available. In low resolution, 2 bits are used for each dot, so four combinations can be represented. In the example here the sequence is 01 (green), 00 (black), 01 (green), 00 (black). See C (color) command below for complete coding of the colors.

**U,D, L,R, E,F, G,H** These commands, followed by a number, will move in one of the following compass directions:




**M*x,y*** Move *x,y* units either relative to the current position or to the absolute coordinates, *x,y*. If the *x* coordinate is prefaced with either a plus sign or a minus sign, the move is relative. Otherwise, the move is absolute. Note, you do not need to include a plus sign in front of the *y* coordinate in a positive *y* move.

**P*p,b*** Paint the color *p* until the border color *b* is found. The paint originates from the current position.

**B** Blank move. The move following a B will move the desired units without plotting points. The next command will then continue drawing.

**N** No update. The DRAW command following an N command will plot points, but the position will not be updated. The next DRAW command will start at the same position as the last.

**C*n*** Change the color to *n*. All DRAWs after a C command will be in color *n*. *n* can be 0 (black) or 1 (white) in high resolution and 0 to 3 in low resolution. In low resolution, the color is dependent on the palette.

| | 320 by 200 | | 640 by 200 |
|---|---|---|---|
| color | palette 0 | palette 1 | |
| 0 | black | black | black |
| 1 | green | cyan | white |
| 2 | red | magenta | no choice |
| 3 | yellow | white | no choice |

```
                MOV     X_TENP,AX
                MOV     AX,Y_POSITION
                MOV     Y_TENP,AX
RET_START:      RET

;----------------------------

UPDATE_END:     MOV     PLOT_FLAG,1             ;Neetore blenk-move fleg.
                CMP     UPDATE_FLAG,1           ;Were we to updete position?
                JZ      NET_END                 ;If yee ekip.
                MOV     AX,Y_TENP               ;Elee, reetore.
                MOV     Y_POSITION,AX
                MOV     AX,X_TENP
                MOV     X_POSITION,AX
                MOV     UPDATE_FLAG,1           ;Reeet updete fleg.
RET_END:        RET

;-------------------------------------------------------;
; This subroutine converte decimel commend number to hex. ;
;-------------------------------------------------------;

CK_NUMBER:      XDN     BX,BX                   ;Initielize to zero.
NEXT_NUMBER:    CMP     BYTE PTN [SI],'0'       ;Is it e number?
                JB      END_NUMBEN              ;If no, we're done.
                CMP     BYTE PTR [SI],'9'
                JA      END_NUMBER
                LODSB                           ;Get number.
                SUB     AL,30N                  ;Convert to hex.
                MOV     CL,AL
                MOV     AX,10                   ;Shift decimel by ten.
                XDN     DX,DX
                MUL     BX
                MOV     BX,AX                   ;Result in BX.
                XDN     CH,CH
                ADD     BX,CX                   ;Add new number.
                JMP     SNDRT NEXT_NUMBER       ;Get next number.

END_NUMBEN:     MOV     AX,BX                   ;Neturn with number in AX.
                RET

;-------------------------------------------------;
; This eubroutine floode the ecreen with e pattern. ;
;-------------------------------------------------;

CLS:            PUSR    DS                      ;Seve dete segment.
                CALL    CK_NUMBEN               ;Get pattern.
                XOR     BX,BX                   ;Offeet zero.
                MOV     CX,0B800N               ;Point to ecreen buffer.
                MOV     DS,CX
                MOV     DX,2                    ;Two ecen line banke.
NEXT_PATTERN:   MOV     CX,2000H                ;One bank.
WRITE_PATTERN:  MOV     [BX],AL                 ;Store byte.
                INC     BX                      ;Bump offeet.
                LOOP    WRITE_PATTERN           ;Next byte.
                ROR     AL,1                    ;Notete two bytee right.
                ROR     AL,1
                OEC     OX                      ;Done second bank?
                JNZ     NEXT_PATTERN            ;If no, do it now.
                POP     OS                      ;Neetore dete segment.
                RET

;-------------------------------------------------------------------------;
; Thie eubroutine painte the firet run end then celle the recureive fill. ;
;-------------------------------------------------------------------------;

PAINT:          CALL    CK_NUMBEN               ;Get fill color.
                CMP     AL,MAX_COLON            ;In renge?
                JA      END_PAINT               ;If no, exit.
                MOV     NEW_COLON,AL            ;Elee, etore.
                INC     SI                      ;Bump pointer paet comme.
                CALL    CK_NUMBEN               ;Get border color.
                CMP     AL,MAX_COLOR            ;In renge?
                JA      END_PAINT               ;If no, exit.
                MOV     BOROER,AL               ;Elee, etore.

                MOV     DX,Y_POBITIDN           ;Get current coordinatee.
                MOV     CX,X_POSITION
                CALL    READ_DOT                ;Ie it on ecreen?
                JC      END_PAINT               ;If no, exit.
                CMP     AL,BOROEN               ;Ie it border color?
                JZ      END_PAINT               ;If yee, exit.
```

*(Figure 1 continues)*

the DRAW.DAT option, that is, enter no parameters on the command line, and you wish DRAW to ignore user keystroke termination, place a K within the file rather than on the command line.

**BRUSH STROKES** While the DRAW command set is modeled on the BASIC DRAW statement, a few of the BASIC commands have been omitted. Too much additional code would have been required

STOP WATCH

MEASURE EXECUTION TIME TO THE MICRO-SECOND

■ ***STOPWATCH® . . . It Measures Program Time with Microsecond Resolution.*** The new STOPWATCH Program measures total and component times of programs executed on IBM PCs, XTs, ATs, and compatible units to within ± 5 microseconds

■ ***STOPWATCH . . . It's Easy to Use.*** With STOPWATCH there's no need to modify your program for testing. Simply key ⟨ctl⟩-M instead of ⟨enter⟩ anytime you want to measure execution time to the next display output (⟨ctl⟩-M and ⟨enter⟩ are equivalent *until* you install STOPWATCH.)

■ ***STOPWATCH . . . Use It To Time New Programs.*** Use STOPWATCH with DEBUG, SYMDEB or COOEVIEW to measure execution time from "GO" to Breakpoint. And, STOPWATCH can be used to time Lotus 1-2-3 Macros, dBASE III Procedures, BASIC Programs, or any object program that you have developed.

■ ***STOPWATCH . . . Use It To Evaluate Your Present System.*** Add STOPWATCH to your present system and measure component times of a program to quickly determine whether a new processor, or faster disk, is the key to improving response time for your application.

■ ***STOPWATCH . . . Unparalleled Accuracy At An Affordable $59.95.*** Included are demo looping programs to demonstrate STOPWATCH's timing ability, the STOPWATCH Program, and a user's manual with easy-to-follow instructions to get you started quickly. Now . . . Microsecond resolution timing — only $59.95! Put your program to the test today with STOPWATCH!

Now Microsecond Resolution Timing Only $59.95

+3.50 S&H
+ 6% NJ Tax
MC/VISA accepted

US 800-345-0167
NJ 201-228-7623

CRTS
CUSTOM REAL TIME SOFTWARE

P.O. Box 1106 West Caldwell, NJ 07007

IBM is a registered trademark of International Business Machines Corp.
CodeView® is a trademark of Microsoft Corp.
Lotus and 1-2-3 are registered trademarks of Lotus Development Corp.
dBase III is a trademark of Ashton-Tate.
®STOPWATCH are Trademarks of Custom Real-Time Software, Inc.

CIRCLE 363 ON READER SERVICE CARD



## ■ PROGRAMMING/UTILITIES

```
                MOV     BX,CX                   ;Store X.
START_LEFT:     DEC     CX                      ;Look to the left.
                CALL    READ_DOT                ;Is it on screen?
                JC      END_LEFT                ;If no, done.
                CMP     AL,BORDER               ;Is it border?
                JZ      END_LEFT                ;If yes, done.
                MOV     BX,CX                   ;Else, update X.
                JMP     SHORT START_LEFT        ;Get next dot to left.
END_LEFT:       MOV     LEFT_X,BX               ;Store left start of run.
                PUSH    BX                      ;Store for next call.

                MOV     CX,X_POSITION           ;Retrieve X again.
                MOV     BX,CX                   ;Store X.
START_RIGHT:    INC     CX                      ;Look right.
                CALL    READ_DOT                ;Is it on screen?
                JC      END_RIGHT               ;If no, done.
                CMP     AL,BORDER               ;Is it border?
                JZ      END_RIGHT               ;If yes, done.
                MOV     BX,CX                   ;Else, update X.
                JMP     SHORT START_RIGHT       ;Get next dot right.
END_RIGHT:      MOV     RIGHT_X,CX              ;Store right end of run.
                PUSH    BX                      ;Store for next call.

                SUB     BX,LEFT_X               ;Get length of run.
                INC     BX
                MOV     CX,LEFT_X               ;Retrieve start of run.
FILL_START:     MOV     AL,NEW_COLOR            ;Retrieve fill color.
                MOV     AH,0CH                  ;Write dot.
                INT     10H
                INC     CX                      ;Next dot.
                DEC     BX                      ;Done?
                JNZ     FILL_START              ;If no, next dot.

                POSH    DX                      ;Store Y.
                DEC     DX                      ;Look up.
                CALL    FILL                    ;And fill shadow.
                POP     DX                      ;Restore Y.
                INC     DX                      ;Look down.
                POP     AX                      ;Retrieve end of run.
                MOV     RIGHT_X,AX
                POP     AX                      ;Retrieve start of run.
                MOV     LEFT_X,AX
                CALL    FILL                    ;Fill shadow.
END_PAINT:      RET

;-----------------------------------------;
; This subroutine does the recursive fill. ;
;-----------------------------------------;

FILL:           MOV     CX,LEFT_X               ;Retrieve left start.
                MOV     NEXT_LEFT,CX            ;Store as next start.

NEXT_FILL:      MOV     CX,NEXT_LEFT
                CALL    READ_DOT                ;Is it on screen?
                JNC     ARDUND                  ;If no, done.
                JMP     END_FILL
ARDUND:         CMP     AL,BORDER               ;Is it border?
                JZ      CK_NEXTLEFT             ;If yes, look right for start.
                CMP     AL,NEW_COLOR            ;Is it already done?
                JZ      CK_NEXTLEFT             ;If yes, check next left.

                MOV     NEXT_RIGHT,CX           ;Store as next right.
                MOV     BX,CX
CK_LEFT:        DEC     CX                      ;Look left.
                CALL    READ_DOT
                JC      END_CK_LEFT             ;Need to be filled?
                CMP     AL,BORDER
                JZ      END_CK_LEFT
                MOV     BX,CX                   ;If yes, update start and
                JMP     SHORT CK_LEFT           ; get next left.
END_CK_LEFT:    MOV     NEXT_LEFT,BX            ;Else, store next left.
                JMP     SHORT CK_RANGE

CK_NEXTLEFT:    INC     CX                      ;Look right.
CK_RIGHT_X:     CMP     CX,RIGHT_X              ;Past end of parent run?
                JG      END_NEXTLEFT            ;If yes, done.
                CALL    READ_DOT                ;Does it need filling?
                JC      END_NEXTLEFT
                CMP     AL,NEW_COLOR
                JZ      GET_LEFT
                CMP     AL,BORDER
```

*(Figure 1 continues)*

to include BASIC's A (set angle) and T (turn angle) commands. On the other hand, because DRAW.COM can use strings of unlimited length (BASIC's are limited to 256 characters), the X (execute substring) command is not needed, and so was not included in DRAW. The BASIC S (set scale) command was sacrificed for an addition to DRAW's command set. DRAW's new S (flood screen pattern)

Order Status,
Technical & Other
Info. (602) 246-2222

Call for programs
not listed

# WAREHOUSE DATA PRODUCTS

**SPECIAL**
WORD PERFECT
**$195**

# TOLL-FREE ORDER LINE 1-800-421-3135

## FREE SOFTWARE! FREE SOFTWARE! FREE SOFTWARE!

Purchase over $100 and receive one of these disks absolutely FREE! Purchases over $250 get two free disks, over $400 get three, or get all four disks when your purchase is over $500! **1) MIXED BAG** — A great assortment of utilities and games all packed on one disk. **2) PC-WRITE** — Try this famous feature packed word processor. It's a winner! **3) FONT-SET** — Lets you set popular fonts like bold, underline, etc. on most late model printers from Citizen, Epson, NEC, Okidata, Panasonic, Star, Toshiba, etc. You can even use your printer like a typewriter! **4) ABC-LIST** — Great mailing list program! Sort on any field, do qualified searches, print reports and mailing labels, and more!

## — SOFTWARE —

### ACCOUNTING

| | |
|---|---|
| BPI AP, AR, PR, GA | $169 ea. |
| Cyma | Call |
| Dac Easy Accounting | 39 |
| Dollers & $ense | 94 |
| Managing Your Money 3 0 | 108 |

### COMMUNICATION PROGRAMS

| | |
|---|---|
| Carbon Copy | 115 |
| Crosstalk | 89 |
| Remote | 69 |
| Smartcom II | 83 |

### DATA BASE MANAGERS

| | |
|---|---|
| Clipper | 380 |
| Clout 2 | Call |
| Condor III | 310 |
| Knowledgeman II | Call |
| Powerbase 2 2 | 212 |
| Q&A | Call |
| Quickcode | 138 |
| Quicksilver | 295 |
| Quickreport | 138 |
| Revelation | 469 |
| R Base System V | 345 |

### EDUCATIONAL

| | |
|---|---|
| Flight Simulator | 28 |
| Turbo Tutor II | 25 |
| Typing Tutor III | Call |

### GRAPHICS

| | |
|---|---|
| Chartmaster | Call |
| Energraphics 2.0 | 269 |
| In-A-Vision | 275 |
| Microsoft Bus Mouse | 106 |
| Microsoft Chart | 164 |
| Microsoft Serial Mouse | 119 |
| Newsroom | 31 |
| OPTI Mouse W/DR Helo II | 106 |
| Printshop | 33 |
| Signmaster | Call |

### INTEGRATED

| | |
|---|---|
| Ability | 59 |
| Enable | 355 |
| Smart Software | Call |

### LANGUAGES

| | |
|---|---|
| Lattice C Compiler | 242 |
| Microsoft C Compiler | 249 |
| Microsoft Fortran 4 0 | 255 |
| Microsoft Macro Assembler | 84 |
| Microsoft Pascal Compiler | 166 |
| Microsoft Quick Basic | 55 |
| Ryan McFarlen Fortran | 305 |
| Ryan McFarlen Cobol | 479 |
| Turbo Pascal w/8087 + BCD | 55 |

### PROJECT MANAGER

| | |
|---|---|
| Harvard Total Project | 262 |
| Microsoft Project | 219 |
| Supar Project Plus | Call |
| Timeline 2 0 | 209 |

### SPREADSHEET

| | |
|---|---|
| Microsoft Multiplan | 108 |
| Spreadsheel Auditor 3 0 | $82 |
| Supercalc 4 | Call |
| VP Planner | 49 |

### UTILITIES

| | |
|---|---|
| Copy II PC | 19 |
| Copywrite | 39 |
| Desqview | 55 |
| Double Dos | 30 |
| Fastback | 85 |
| Graph in the Box | 55 |
| Homebase | 39 |
| Microsoft Windows | 55 |
| Norton Utilities 3.1 | 48 |
| Prokey 4.0 | 70 |
| Sidekick (unprotected) | 47 |
| Sideweys 3 1 | 36 |

### WORD-PROCESSING

| | |
|---|---|
| Easy Extra | 88 |
| Microsoft Word | 252 |
| Multimate Advantage | Call |
| Peachtext 5000 | 145 |
| Volkswriter 3 | 139 |
| Webster Spellcheck | 37 |
| Word Perfect | 195 |
| Wordstar | 162 |
| Wordstar Propac | 233 |
| Wordstar 2000 | 233 |
| Wordster 2000+ | 278 |

## — HARDWARE —

### ACCESSORIES

| | |
|---|---|
| Copy II PC Board | 75 |
| 150 watt power supply | 69 |
| Mini Micro Perallel Print Buffer | 69 |
| Mesterpiece | 88 |
| Mesterpiece Plus | 113 |

### BOARDS

| | |
|---|---|
| AST Adventege Premium | 429 |
| AST Premium Sixpac | Call |
| AST Sixpac (384K) | 199 |
| Hercules Color Card | 145 |
| Hercules Graphics + | 182 |
| Intel Above Boards | Call |
| J Laser (Tall Tree) | Call |
| J Ram 3 (Tall Tree) | 159 |
| J Ram 3 AT (Tall Tree) | 199 |

### COMPUTERS

**AZ TURBO PC**
IBM Compatible Computer, 4 77 or 7 47 key selectable, keyboard, 640K, dual drive, mono graphics card, 150 watt power supply ..... 719
or with 20 MB Seegete Hard Drive ..... 1025
6 month limited werranty

**AZ TURBO AT**
IBM AT Compatible, 512K, 6 & 8 MHZ, keyboard, graphics card, 220 watt power supply, MS/DOS 3.2 GW Basic ..... 1260

**AST 286 PREMIUM COMPUTER**
512K, expandable to 2MB on the system board, RT enhanced style keyboard, parallel, serial and clock, 1.2 MB floppy disk drive, 7 expansion slots, two 32 bit fastram slots, DOS 3.1 & Basic
1 year warranty ..... Call

| | |
|---|---|
| Sherp Portable | Call |

### EGA BOARDS

| | |
|---|---|
| Everex Enhencer EGA | 235 |
| Peredise Auto Switch 480 EGA Card | 379 |
| Qued EGA Plus | 349 |
| STB EGA Plus | Call |
| Vega Deluxe | Call |
| Vega Video | 299 |

### EGA MONITORS

| | |
|---|---|
| AMDEK 722 | 455 |
| NEC Mullisync | 559 |
| Packerd Bell EGA | 450 |

### HARD DRIVES

| | |
|---|---|
| AZ 20 MB Hard Card | 425 |
| AZ 30 MB Herd Card | Call |
| Filecard 20 MB | 555 |
| Maynard 20 MB Hard Card | Call |
| Plue Hardcard 20MB | 665 |
| Seagate 20 MB Int w/cont. | 355 |
| Seegete 30 MB Int w/cont. | 399 |
| Seegate 30 AT Int | 539 |

**INCREDIBLE VALUES**
Nationally advertised boerds for IBM PC and most compatibles at give away prices

| | |
|---|---|
| Keyboards (similer to 5151) | $79 |
| Monochrome Board w/printer port (similar to Hercules Graphics) | $79 |
| Expansion Boerd 0 lo 576K | $42 |
| Mullifunction Board w/game port (similar to AST six pack) | $79 |
| Four Drive Floppy Controller | $39 |
| Color Card w/o printer port | $69 |
| Color card w/printer port | $79 |

### KEYBOARDS

| | |
|---|---|
| Keytronics 5151 | $162 |
| Keytronics 5153 | 269 |

### MODEMS

| | |
|---|---|
| Everex 300/1200 | 120 |
| Hayes 1200 | Call |
| Hayes 1200B | Call |
| U S Robotics Courier 2400 | 349 |
| U S Robotics Passwd 1200 | 180 |

### MONITORS

| | |
|---|---|
| AMDEK 410 Amber | 157 |
| AMDEK 600 | 339 |
| Magnovox Color RGB | Call |
| Multitech Color RGB | 299 |
| Princeton Max 12 | 159 |
| Samsung TTL Amber | 72 |
| Samsung TTL Green | 70 |

### PRINTERS

| | |
|---|---|
| **CANON LASER** | 1939 |
| **CITIZEN** | |
| MSP-10 | 279 |
| MSP-15 | 379 |
| MSP-20 | 315 |
| Premiere 35 Daisywheel | 459 |
| **EPSON** - Call on all models | |
| **FUJITSU** | |
| DX2100 Parallel | Call |
| DL2400 Ser/Per | Call |
| **LASER IMAGE 2000** | Call |
| **NEC** | |
| NEC P5XLP | 1095 |
| NEC P7 Parallel | 619 |
| NEC 8850 | 1059 |
| NEC P6 Parallel | 439 |
| **OKIDATA** - Call on all models | |
| **PANASONIC** | |
| 1091-I | 259 |
| 1092-I | 329 |
| 1592 | 425 |
| KXP3151 | 399 |
| **STAR MICRONICS** | |
| NP10 | Call |
| NB15 | 975 |
| NX10 | 232 |
| SG15 | 365 |
| SR15 | 549 |
| **TOSHIBA** - Call on all models | |

### RAM

| | |
|---|---|
| 64K 150NS (set of 9) | 10.50 |
| 256K 150NS (set of 9) | 27 |
| 256K 120NS (set of 9) | Call |

**TERMS:** Shipping on most software is $5.00. AZ orders +6.7% sales tax. Personal check/company check allow fourteen (14) days to clear. We accept purchase orders from authorized institutions for 3.5% more than cash price. All returns are subject to our approval. There will be a 20% restock fee. Minimum phone order $50. All prices are subject to change. Due to copyright laws we cannot take back any open software.

No Charge for Master Card or Visa

We do not guerantee compatibility

TOLL-FREE ORDER LINE 1-800-421-3135
WAREHOUSE DATA PRODUCTS
2701 West Glendale Ave. • Phoenix, AZ 85051

Phone Hours: Monday, Wednesday & Thursday 7 am-9 pm, Tuesday & Friday 7 am-5 pm, Saturday 9 am-5 pm. MST.

CIRCLE 171 ON READER SERVICE CARD

# DISKCAT-5

*Disk File Catalog Program*

- ☑ Finds files *fast!* - on ALL your disks.
- ☑ Stores 32,000 names.
- ☑ Add descriptions to meaningless file names.
- ☑ Print directory labels to attach to disks.
- ☑ Sort/print catalog by file name, extension, size, date, category or by disk name.

NEW LOW PRICE: $49
Demo and manual - $8
(Applicable to purchase price.)

FORD SOFTWARE
4845 Willowbend
Houston, TX 77035
(713) 721-5205
MC/VISA Accepted

CIRCLE 316 ON READER SERVICE CARD

**"Almost every local user group and bbs maintains a library of public domain software . . .**

. . .Unfortunately, many of these collections can be overwhelming, especially for users who are not familiar with the entries. The Public (Software) Library may provide an alternative with its large collection arranged on disk by category. The library is regularly updated and cleaned out and documentation added or improved when necessary. The library's copying and handling charges are also among the lowest of any group."

-Steven Rosenthal, PC Week
September 11, 1985

**For the latest monthly newsletter and library listing, send $1 to the**

**Public (Software) Library**

P.O. Box 35705 P
Houston, TX 77235-5705
(713) 721-6104

CIRCLE 316 ON READER SERVICE CARD


## ■ PROGRAMMING/UTILITIES

```
                JNZ     END_NEXTLEFT

GET_LEFT:       INC     CX                      ;If no, look right.
                JMP     SHORT CK_RIGHT_X
END_NEXTLEFT:   MOV     NEXT_LEFT,CX            ;Else, store as new left.
                MOV     NEXT_RIGHT,CX           ;And right.

CK_RANGE:       MOV     BX,NEXT_LEFT            ;Is next left past right?
                CMP     BX,RIGHT_X              ;If yes, done.
                JLE     FIND_RIGHT
                JMP     END_FILL

FIND_RIGHT:     MOV     BX,NEXT_RIGHT
                MOV     CX,BX
CK_RIGHT:       INC     CX                      ;Look right and find end of run.
                CALL    READ_DOT
                JC      END_CK_RIGHT
                CMP     AL,BORDER
                JZ      END_CK_RIGHT
GET_RIGHT:      MOV     BX,CX
                JMP     SHORT CK_RIGHT
END_CK_RIGHT:   MOV     NEXT_RIGHT,BX           ;Store as next right.

                MOV     CX,NEXT_LEFT            ;Get length of run.
                SUB     BX,CX
                INC     BX
FILL_RUN:       MOV     AL,NEW_COLOR            ;And fill with new color.
                MOV     AH,0CH
                INT     10H
                INC     CX
                DEC     BX
                JNZ     FILL_RUN

RECURSIVE:      PUSH    LEFT_X                  ;Store all variables on stack.
                PUSH    RIGHT_X
                MOV     CX,NEXT_LEFT
                PUSH    CX
                MOV     LEFT_X,CX
                MOV     CX,NEXT_RIGHT
                PUSH    CX
                MOV     RIGHT_X,CX
                PUSH    DX
                DEC     DX                      ;Look up.
                CALL    FILL                    ;And call on self for shadow.

                POP     DX                      ;Retrieve Y, next left
                POP     CX                      ; and next right.
                MOV     RIGHT_X,CX
                MOV     NEXT_RIGHT,CX
                POP     AX
                MOV     LEFT_X,AX
                MOV     NEXT_LEFT,AX
                PUSH    CX                      ;Store next right and Y
                PUSH    DX                      ; back on the stack.
                INC     DX                      ;Look down.
                CALL    FILL                    ;And call on self for shadow.

                POP     DX                      ;Retrieve all variables.
                POP     CX
                MOV     NEXT_RIGHT,CX
                ADD     CX,2                    ;Skip to next possible next left.
                MOV     NEXT_LEFT,CX
                POP     RIGHT_X                 ;Restore rest of variables.
                POP     LEFT_X

                CMP     CX,RIGHT_X              ;Looked all the way right?
                JG      END_FILL                ;If yes, done.
                JMP     NEXT_FILL               ;Else, repeat for entire shadow.

END_FILL:       RET

;-------------------------------------------------;
; This subroutine checks to see if the coordinates ;
; are on the screen. If it is, it then reads the dot. ;
;-------------------------------------------------;

READ_DOT:       CMP     CX,0                    ;Check column boundries.
                JB      OFF_SCREEN
                CMP     CX,X_BOUNDRY
                JA      OFF_SCREEN
```

*(Figure 1 continues)*

command can be used to change the entire background color quickly. (The P, or paint, command is much slower.) The S command also lets you fill the screen with an 8-bit pattern. For more details, see the table, "DRAW's Command Set." A colon is used to mark the beginning of a comment field. DRAW ignores everything encountered after a colon until it reaches the end of a line. The colon works the same as

New Version 3.0 with
- New Network Commands
- NETBIOS Support

# *EasyLAN*—Networking With Netbios Support. And it's Only $99.95 Per PC.

If you own two or more PCs then you need *EasyLAN*™ version 3.0.

### THE *EasyLAN* OFFICE NETWORK

*EasyLAN* shares printers and disk drives between IBM PCs. *EasyLAN* can save you $1,000 or more per PC by eliminating duplicate equipment purchases.

And now, you can run NETBIOS supported applications. Or you can write your own network applications for *EasyLAN* and other NETBIOS compatible networks.

### *EasyLAN* VERSION 3.0 HIGHLIGHTS

- ***EasyLAN* shares printers, plotters, data, and disk storage**
- **Supports up to 18 PCs or compatibles**
- **New Network Commands**
- **New NETBIOS**
- **PC to PC file transfer**
- **Print spooling**
- **PBX support**
- **Easy to install**
- **Easy to operate**
- **Modem support**
- **Performs in the background**

*EasyLAN*'s low price matches the small business user's cost-sensitive budget. It is the office network solution for less than $100 per PC.

*EasyLAN* performs its operations concurrently in the background. *EasyLAN* communications, file transfers and printer operations all take place while each PC simultaneously performs such normal DOS applications as Lotus 1-2-3,™ Wordstar,™ and dBASE.™

**NEW NETBIOS SUPPORT—WRITE YOUR OWN COMMUNICATIONS PROGRAMS.**

Programmers may use *EasyLAN* to develop network applications using NETBIOS (interrupt 5c) These applications can now be operated across the low cost RS 232 communications links used by *EasyLAN* Our new *EasyCALENDAR* program is an example of a network application that uses NETBIOS for program to program communications.

Multi user data base management applications that require a high overhead network operating system will perform faster on high-cost networks operating at mega bit speeds.

**NEW VERSION 3.0 COMMANDS EXPAND NETWORK FLEXIBILITY**

EZCLOCK lets PC's attached to the network read the time and date from a single master clock on the central PC, eliminating the need to install individual clock boards in each PC and insuring that all file entries and updates made across the network are dated.

The EZ Make Directory and EZ Remove Directory commands function identically to the DOS MKDIR and RMDIR commands, and give remote users increased flexibility when it comes to managing subdirectories on the central PC

EZBEEP lets you send an audible signal across the network, alerting a PC user that a file or message is being sent

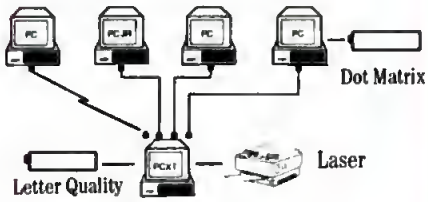
***EasyLAN* PBX SUPPORT BRINGS NEW FLEXIBILITY TO PC CONNECTIVITY**

With *EasyLAN*'s PBX support, users can share peripherals and transfer files using PBX switched-circuit connections and existing twisted pair wiring *EasyLAN* has already been installed on a number of different PBX's, and recently was certified by Northern Telecom for use on its Meridian SL 1.

*"The value is high* 🖳🖳🖳🖳*"*
**—InfoWorld Report Card**

Disk sharing uses *EasyLAN*'s EZCOPY command to move files to and from PC's. ASCII or binary files can be transferred in the foreground, or in the background while other DOS programs run.

Printer sharing operates transparently with existing programs. Print files are automatically spooled to disk and scheduled for printing. Multiple printers on the central PC may be designated for individual printing tasks.




***EasyLAN* Office Network**

### *EasyLAN* SPECIFICATIONS

Each PC in the network requires an individual licensed copy of the *EasyLAN* program and takes 20k of memory on each satellite PC, a serial port, and DOS 2.0 or above. *EasyLAN* runs on all IBM PC models and compatibles. The central PC requires a serial port for each satellite PC. The COM2 and COM6 boards are serial port expansion boards which permit you to add serial ports to the central PC.

### EASY TO INSTALL

*EasyLAN* can be installed in less time than it takes to enjoy your coffee break. Just plug the *EasyLAN* cables into existing serial ports. The *EasyLAN* Network Configuration Program provides menu driven installation program that will guide you step-by-step through the software installation process.

***EasyCALENDAR*—USE YOUR NETWORK TO SCHEDULE MEETINGS.**

The first of a new series of *Easy* network application products using NETBIOS is now available *EasyCALENDAR* handles time management applications for individuals or a department and can be run on personal computers attached to any NETBIOS compatible network

**Highlights:**

**CALENDAR MANAGEMENT** for individuals and the work group

**TASK MANAGEMENT** to create, maintain and review to do lists

**TODAY'S NEWS** for broadcasting messages, notices or announcements across the network

**MENU INTERFACE** for easy set up and use.

*EasyCALENDAR*'s Data base for appointments, to do lists and news resides on the central PC Satellite PCs attached through *EasyLAN* version 3.0 send network transactions to the central data base to invoke *EasyCALENDAR* functions

The *EasyCALENDAR* calendaring program requires *EasyLAN* version 3 0 and is priced separately

*EasyCALENDAR* will be available March 1987 Advance orders are being accepted now.

*"I bought access to a laser jet printer for less than $100."*
**—CONOCO Oil User**

EasyLAN

**ORDER TODAY 1-800/835-1515 in CA 408/738-8377**

## *EasyLAN* Order Form

To Order by Phone—Call **800/835-1515**
In CA **408/738-8377**
For Configuration Assistance & Technical Questions
Call 408/738 8377

**Place your Order Immediately**
**Dealer Inquiries Invited**

Name _____
Address _____
_____
_____
City _____
State _____ Zip _____
Telephone (_____) _____

Payment: Visa, MasterCard, Check, COD, Bank Draft
Name on Credit Card _____
Cr. Card No. _____ Exp Date ___/___

Server Technology, Inc., 140 Kifer Court
Sunnyvale, CA 94086 Telex 5106003481

| Item | Description | Price | Qty | Amount |
|---|---|---|---|---|
| EL 02 | *EasyLAN* Kit—for 2 PCs 30' cable, two disks & manuals | $219.95 | ____ | $ ____ |
| EL 03 | *EasyLAN* Expansion Kit—for 1 PC 30' cable, one disk & manual | $119.95 | ____ | $ ____ |
| EL 10 | *EasyLAN* disk & manual (3½" disk $89.95) | $ 99.95 | ____ | $ ____ |
| EL 12 | *EasyLAN* 30' cable | $ 49.95 | ____ | $ ____ |
| EL 13 | COM2 serial port expansion board, two ports | $219.95 | ____ | $ ____ |
| EL 14 | COM6 serial port expansion board, six ports | $499.95 | ____ | $ ____ |
| EC 01 | Easy CALENDAR Kit Supports 5 PC's and 10 people | $199.95 | ____ | $ ____ |
| EL 15 | Custom length cables, call for quote | | | |
| | CA res add applicable sales tax | | | $ ____ |
| | Shipping charge USA $10 00, other $20 00 | | | $ ____ |
| | **TOTAL ORDER** | | | $ ____ |

For European Sales and reseller information contact:
Trust Int'l Brussel/Bruxelles Belgium 02/660/8924 Telex: 62803, Telefax: 02/6608868

CIRCLE 520 ON READER SERVICE CARD

the apostrophe in BASIC and the semicolon in assembler.

DRAW parses the command strings the same way that PLAY does, so I won't repeat the detailed explanation given in the last issue. DRAW first checks whether "X" is the first character in the command string. If not, DRAW defaults to changing to 640 by 200 black-and-white graphics mode by issuing INT 10H, function 0 (set mode) with AL = 6. If "X" is found, 320 by 200 color graphics mode is selected. The X command can be followed by a palette number, either zero or one. The color set is changed via INT 10H, function 0BH (set color palette).

Once in graphics mode, DRAW starts executing the individual draw commands. When DRAW encounters a directional move, E5, for example, it's a simple matter for the program to plot the desired diagonal line. E5 is a diagonal move of 5 units in the northeast direction. DRAW first adds 5 units to the current *x* coordinate and subtracts 5 units from the *y* coordinate to see if this is a valid command, i.e., if the resulting position is still within the boundary of the screen. DRAW then issues INT 10H, function 0CH (write dot), five times, each time incrementing the column and decrementing the row by one. The color of the plotted dot is the last set with the C command. The drawing is skipped if the previous command was B (blank move) and only the coordinates are changed. If N (no update) was the previous command, DRAW only draws the line. Similar calculations are made when DRAW encounters the other directional moves (U,D,L, R,E,F,G,H).

■ When DRAW encounters a directional move, E5, for example, it's a simple matter for the program to plot the desired diagonal line.

```
                CMP     DX,0                    ;Check row boundries.
                JB      DFF_SCREEN
                CMP     DX,Y_BOUNDRY
                JA      DFF_SCREEN

                MOV     AH,0DH                  ;Read dot.
                INT     10H
                CLC
                RET                             ;Return with color in AL.

DFF_SCREEN:     MOV     AL,-1                   ;Out of bounds.
                STC
                RET

BDFF0R:

CODE ENDS
END  START
```

*(Figure 1 ends)*

```
100 REM -- BASIC PROGRAM TO CREATE DRAW.COM
110 OPEN "DRAW.COM" AS #1 LEN = 1
120 FIELD #1,1 AS A$
130 CHECKSUM = 0
140 FOR I = 1 TO  199
150    LINESUM = 0
160    FOR J = 1 TO 8
170       READ BYTE
180       CHECKSDM = CHECKSUN + BYTE
190       LINESUM = LINESUM + BYTE
200       IF (BYTE < 256) THEN LSET A$ = CHR$(BYTE)
210       PUT #1
220    NEXT J
230    READ LINECHECK
240    IF LINECHECK <> LIMESUM THEN PRINT "Error in Line";200 + 10 * I
250 NEXT I
260 CLOSE
270 IF CHECKSUM = 142750 THEN PRINT "Succeeeful Completion!" : END
280 PRINT "COM file is not valid!" : 8MD
290 DATA     233,    138,      0,     67,    111,    112,    121,    114,    896
300 DATA     105,    103,    104,    116,     32,     49,     57,     56,    622
310 DATA      55,     32,     90,    105,    102,    102,     45,     68,    599
320 DATA      97,    110,    105,    115,     32,     80,    117,     90,    762
330 DATA     100,    105,    115,    104,    105,    110,    103,     32,    702
340 DATA      67,    111,     46,     26,     77,    105,     99,    104,    635
350 DATA      97,    101,    108,     32,     74,     46,     32,     77,    567
360 DATA     101,    102,    102,    111,    114,    100,     68,     82,    700
370 DATA      65,     87,     46,     68,     65,     84,      0,      0,    415
380 DATA       0,      0,     63,      1,     99,      0,     87,      2,    252
390 DATA       0,      0,      0,      0,      0,      0,      0,      0,      0
400 DATA       0,      0,      0,      0,      0,      0,      0,      0,      0
410 DATA       0,      0,      0,      0,      1,      1,      1,      0,      3
420 DATA       1,      0,      0,      0,      0,      0,      0,      0,      1
430 DATA       0,      0,     68,    114,     97,    119,     32,    114,    544
440 DATA     101,    113,    117,    105,    114,    101,    115,     32,    798
450 DATA      67,     71,     65,     32,     97,    100,     97,    112,    641
460 DATA     116,    101,    114,     46,     36,    184,     64,      0,    661
470 DATA     142,    216,    129,     62,     99,      0,    188,      3,    831
480 DATA      14,     31,    117,      9,    186,    114,      1,    100,    652
490 DATA       9,    205,     33,    205,     32,    128,     62,    128,    802
500 DATA       0,      0,    116,     66,    190,    129,      0,    172,    673
510 DATA      68,     13,    116,     50,     68,     47,    116,     19,    489
520 DATA      60,     48,    114,    243,    190,      6,     71,      1,    741
530 DATA       1,     60,     97,    114,    234,    128,    188,    255,    989
540 DATA      95,    235,    228,     68,     47,    117,      4,    190,    904
550 DATA      68,    255,      8,    172,     60,     13,    116,     22,    706
560 DATA      36,     95,     60,     75,    117,      5,    190,      6,    592
570 DATA      73,      1,      1,     60,     70,    117,    220,    198,    748
580 DATA       6,     72,      1,      1,    235,    221,    128,     62,    726
590 DATA      71,      1,      1,    116,      5,    186,     62,      1,    443
600 DATA     235,     10,    128,     62,     72,      1,      1,    117,    626
610 DATA      71,    186,    130,      0,    184,      0,     61,    205,    937
620 DATA      33,    114,     59,    139,    216,    186,     53,      7,    807
630 DATA     185,      0,    240,    180,     63,    205,     33,    139,   1845
640 DATA     200,    198,     53,      7,    191,     53,      7,    172,    873
650 DATA      36,    127,     60,     58,    116,     28,     60,     97,    502
660 DATA     114,      2,     36,     95,     60,     32,    118,      1,    450
670 DATA     170,    226,    236,    198,      5,     13,    190,     53,   1091
680 DATA       7,    235,     16,    172,     36,    127,     60,     10,    663
690 DATA     116,    239,    226,    247,    235,    237,    205,     32,   1537
700 DATA     198,    130,      8,    128,     60,     88,    117,     41,    754
710 DATA      70,     86,    184,      4,      8,    205,     16,    199,    764
720 DATA       6,     74,      1,    159,      0,    199,      6,     78,    523
730 DATA       1,     63,      1,    198,      6,    100,      1,      3,    373
740 DATA     198,      6,    184,      1,      3,    232,    241,      2,    787
750 DATA     183,      1,    100,     11,    205,     16,     94,    235,    925
760 DATA       7,    184,      6,      0,     86,    205,     16,     94,    598
770 DATA     128,     62,     73,      1,      1,    116,      6,    188,    567
```

*(continues)*

**Figure 2:** *A BASIC program that will automatically create DRAW.COM.*

# All orders shipped within 24 hours!

## SOFTWARE

**ANSA**
Paradox $400.00

**AMERICAN SMALL BUSINESS SYSTEMS**
Prodesign II $180.00

**ASHTON-TATE**
Dbase III + $407.00
Framework 410.00
Multimate 248.00
Multimate Advantage 315.00

**BORLAND**
Database Tool Box $ 39.00
Graphics Toolbox 39.00
Lightning 61.00
Reflex 85.00
Sidekick 48.00
Super Keys 41.00
Turbo Jumbo Pack 175.00
Turbo Pascal (8087 + 8CD) 60.00
Turbo Tutor 21.00

**BPI**
AR, AP, General Accounting and Payroll $175.00 each
Inventory, Job Cost and Church Management CALL

**BREAKTHROUGH**
Timeline $230.00
Timeline Graphics $105.00

**BROWNBAG SOFTWARE**
Homebase $ 64.00
PC Outline 64.00
Utilities 93.00

**CENTRAL POINT**
Copy II PC $ 24.00
Copy II Options Board 80.00
PC Tools 24.00

**CHIP SOFT**
TURBO TAX
Personal Federal $ 45.00
Personal State $ 28.00
Professional Federal $180.00
Professional State $120.00

**COMPUTER ASSOCIATES** (I U S)
Easy Plus (windowing) CALL
Easy Systems Acctg (per module) FOR
Supercalc IV PRICES
Super Project Plus

**COSMOS**
Revelation $500.00

**DAC**
Easy Accounting $ 48.00
Easy Payroll 36.00
Payroll Tutor 14.00
Accounting Tutor 14.00

**DIGITAL RESEARCH**
Gem Collection $ 75.00
Gem Desktop 30.00
Gem Draw Plus 190.00
Gem Graph 148.00
Gem Wordchart 88.00

**EXECUTIVE SYSTEMS**
X Tree $ 29.00

**FIFTH GENERATION**
Fastback $ 95.00

**FINOT GROUP**
Keep Track Plus $ 58.00

**FUNK SOFTWARE**
Sideways $ 37.00

**HARVARD**
Presentation Graphics $230.00
Total Project Manager 280.00

**HOWARD SOFT**
Tax Preparer $199.00
CA Sup 80.00

**IBM**
DisplayWrite IV $360.00
DOS 3.1 65.00
DOS 3.2 80.00

**JAVELIN**
Javelin CALL

**LATTICE**
C Compiler $250.00
Run C 94.00

**LEADING EDGE**
Word Processor w/Mail Merge & Spell 80.00

**LOTUS CORPORATION**
Lotus 1-2-3 $305.00
Lotus Report Writer 110.00
Symphony 435.00
Symphony Spell Checker 105.00
Freelance Plus 355.00
Graphwriter 320.00
Hal 109.00

**MECA**
Managing Your Money $119.00

**MERIDIAN**
Carbon Copy $109.00
(minimum of two pieces)

**MICROGRAPHX**
In-A-Vision $275.00
PC Draw 220.00

**MICROPRO**
Prapak Ver IV 250.00
WordStar 175.00
WordStar 2000 245.00
WordStar 2000 Plus 290.00

**MICROPROSE** (strategic games)
Crusade in Europe $ 25.00
Decision in the Desert $ 25.00
F-15 Strike Eagle 22.00
Silent Service 22.00
Solo Flight 22.00

**MICRORIM**
R:Base System V $365.00

**MICROSOFT**
C Compiler (Version 4) $265.00
Chart 185.00
Cobol Compiler 415.00
Fortran Compiler 215.00
Macro Assembler 90.00
Multiplan 125.00
Project (Version 3) 265.00
Quick Basic 62.00
Windows 62.00
Word (Version 3.1) 285.00
Flight Simulator 33.00
Learning DOS 32.00

**MICROSTUF**
Crosstalk XVI $ 99.00
Crosstalk Mk IV 155.00

**NASHOBA**
Nutshell $105.00

**NEW ENGLAND SOFTWARE**
Graph-in-the-Box (Pro) $ 55.00
Graph-in-the-Box (Unpro) 85.00

**NANTUCKET**
Clipper $385.00

**PAPERBACK SOFTWARE**
VP Planner $ 55.00
VP-Info 55.00

**PAUL MACE SOFTWARE**
Mace Utilities $ 62.00

**PETER NORTON COMPUTING**
Norton Advanced $ 79.00
Norton Utilities 52.00

**QUAID SOFTWARE**
Copywrite (w/zero disk) $ 38.00

**ROSESOFT**
Prokey $ 75.00

**SIMON & SCHUSTER**
Typing Tutor $ 32.00
Webster Spell Check 35.00
Webster Thesaurus 45.00
New World Writer 79.00

**SOFTLOGIC**
Carousel $ 33.00
Cubit 30.00
Disk Optimiser 33.00
Double DOS 30.00

**SOFTSTYLE**
Printworks $ 38.00
Printworks (laser) 68.00

**SOFTWARE GARDENS**
Dan Bricklin's Demo Program $ 60.00

**SOFTWARE GROUP**
Enable $335.00

**SOFTWARE PUBLISHING**
First Choice $ 90.00
Pro Writer 115.00
Pro File 142.00

**SOFTWARE RESEARCH TECHNOLOGY**
Smartkey $ 36.00
Smartkey w/Smartprint 49.00

**SOFTWARE TOOLS**
Viewgen (Version 2) $ 95.00

**SPRINGBOARD**
Newsroom Pro 79.00
Certificate Maker 36.00

**STERLING SOFTWARE**
Intelligent Backup $ 80.00

**SUMMIT**
Better Basic $155.00

**SYMANTEC**
Q & A $205.00

**T/MAKER**
Click Art Personal Publisher $115.00

**TURNER HALL**
SQZ $ 58.00
Note It 58.00

**UNISON WORLD**
Art Gallery I $ 21.00
Art Gallery II 24.00
PrintMaster 32.00
Newsmaster 55.00

**WORDPERFECT CORP.**
WordPerfect $215.00
WordPerfect Library 64.00

**WORDTECH**
Quicksilver $325.00
MS DOS Libraries 52.00
LAN File Server 70.00
D8XL 90.00

**XEROX**
Ventura Desktop $640.00

## HARDWARE

**AMDEK**
310A $149.00

**AST** (expansion cards)
Rampage AT 445.00
Rampage PC 260.00
Six Pack 165.00

**C. ITOH** (printers)
C310 CALL
C315 CALL

**FUJITSU**
P.C. Half Height Drive $ 85.00

**HERCULES**
Graphics Plus 185.00

**IBM**
ProPrinter $420.00
ProPrinter XL 650.00

**IMSI**
PC Mouse & Dr. Halo II $105.00

**INTEL**
Above Board AT 128 $375.00
Above Board PC 64 240.00
Above Board PS 256 340.00
8087 (I8M) 115.00
8087 (8 mhz.) 160.00
80287 185.00

**MICROSOFT**
Mouse (serial) $127.00
Mouse (bus) 120.00
Mach 10 285.00

**NEC**
1401 Multisync Monitor $575.00

**PARADISE**
EGA Auto Switch $355.00

**PLUS**
The Hard Card 20 meg $710.00

**PRACTICAL PERIPHERALS**
Modem 1200 (Internal) $130.00
Modem 1200 (External) 170.00
Multifunction Card w/1200 Modem 300.00
Complete System 160.00

**SEAGATE**
20 MB Hard Drive w/Wd. Controller $445.00

**SIGMA DESIGNS**
EGA Card $390.00

**TOSHIBA**
321 $465.00
341 750.00

**U.S. ROBOTICS**
Direct 1200 (ext) $125.00
Direct 1200 (int) 110.00
Direct 2400 (int) 195.00

## CABLES

6-ft. Modem Cable $ 15.00
6-ft. Parallel Printer Cable 15.00
Surge Protectors 24.00

**TERMS:**
- No surcharge Visa or Mastercard.
- Add $2.00 for C.O.D.—All C.O.D. cash or certified check only
- Prices subject to change without notice
- Short shipments must be reported to us within 24 hours of receipt
- Non-defective goods must be returned with seals intact within 10 days of receipt for full refund
- Shipping costs will not be refunded
- No returns accepted without RMA #
- No returns on non-defective hardware
- Management reserves the right to charge up to 10% restocking fee
- Shipping charge $3.00 per item in California, $4.00 per item elsewhere. This does not apply to bulk orders. Shipping costs for hardware items will be higher
- Terms extended to *Fortune 1,000* companies, government institutions, schools and universities

INQUIRIES **818·881·6096** ORDER ONLY **800·225·8084**

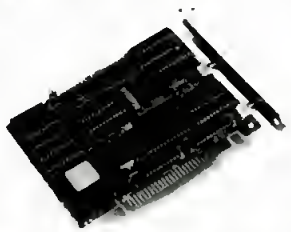
6925 Canby Street, Suite #103, Reseda, California 91335

CIRCLE 179 ON READER SERVICE CARD

# MICROWAY ACCELERATES YOUR PC!

## FastCACHE-286™

**Runs your PC Faster than an AT!**
Runs the 80288 at 9 or 12 MHz and the 80287 at 8, 9 or 12 MHz. Includes 8 kbytes of 55ns CACHE.



Compatible with Leading Edge Model D, Compaq, and Turbo motherboards. Includes 8088 Reboot Switch, DCache, Print Spooler and Diagnostics... **From $449**

## LOTUS/INTEL EMS SPECIFICATION BOARDS

**MegaPage™** The only EMS board which comes populated with two megabytes of cool-running, low power drain CMOS RAM installed. Includes RAM disk, print spooler, disk cache and EMS drivers. For the IBM PC, XT and compatibles...**$549**

**MegaPage** with ØK..... **$149**

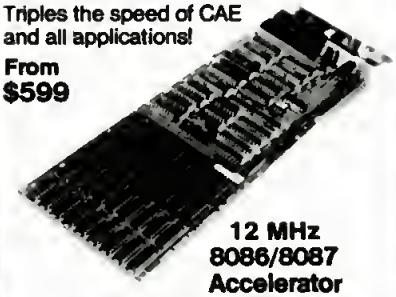
**MegaPage AT/ECC™** EMS card for the PC AT and compatibles Includes Error Correction Circuitry. With ECC, 11 RAM chips cover 256K so the user never encounters RAM errors. Sold populated with 1 megabyte CMOS... **$699** or with 3 megabytes CMOS cool running low power drain RAM... **$1295**. Optional serial/parallel daughterboard..... **$95**

**INTEL, JRAM, or Maynard..... CALL**

## NUMBER SMASHER/ECM™

Triples the speed of CAE and all applications!

**From $599**



**12 MHz 8086/8087 Accelerator Plus A Megabyte for DOS!**

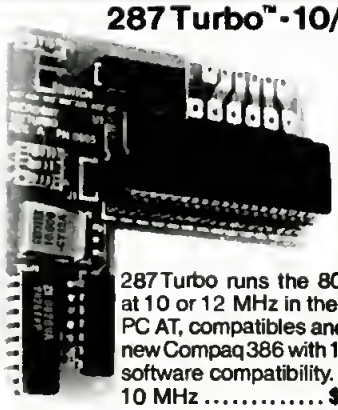
For the IBM PC, XT and compatibles

***PC Magazine* "Editor's Choice"**

## 8087 SOFTWARE

| | |
|---|---|
| IBM BASIC COMPILER | $465 |
| MICROSOFT QUICK BASIC | $79 |
| 87BASIC COMPILER PATCH | $150 |
| 87BASIC/INLINE | $200 |
| IBM MACRO ASSEMBLER | $155 |
| MS MACRO ASSEMBLER | $99 |
| 87MACRO/DEBUG | $199 |
| MICROSOFT FORTRAN V4 | $299 |
| RM FORTRAN | $399 |
| LAHEY FORTRAN F77L | $477 |
| MS or LATTICE C | CALL |
| STSC APL★PLUS/PC | $450 |
| STSC STATGRAPHICS | $675 |
| SPSS/PC+ | $695 |
| 87SFL Scientific Functions | $250 |
| 87FFT | $200 |
| OBJ → ASM | $200 |
| PHOENIX PRODUCTS | CALL |

## 287 Turbo™-10/12



287 Turbo runs the 80287 at 10 or 12 MHz in the IBM PC AT, compatibles and the new Compaq 386 with 100% software compatibility.

10 MHz ..... **$450**
12 MHz ..... **$550**

***PC Magazine* "Editor's Choice"**

## 8087 UPGRADES

All MicroWay 8087s include a one year warranty, complete MicroWay Test Program and installation instructions.

**8087 5 MHz**..... **$105**
For the IBM PC, XT and compatibles

**8087-2 8 MHz**..... **$154**
For Wang, AT&T, DeskPro, NEC, Leading Edge

**80287-3 5 MHz**..... **$179**
For the IBM PC AT and 286 compatibles

**80287-6 6 MHz**..... **$229**
For 8 MHz AT and compatibles

**80287-8 8 MHz**..... **$259**
For the 8 MHz 80286 accelerator cards and Compaq 386

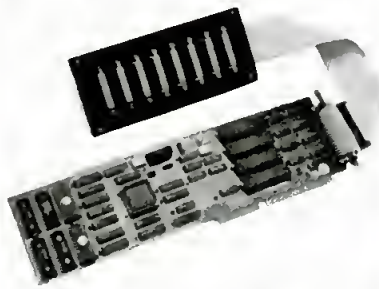
**80287-10 10 MHz**..... **$395**

**PC-PAL™ Programmer**..... **$395**

**Call for great prices on V20, V30, 64K, 128K and 256K RAM**

## AT8™

Turns your AT into a high speed, multi-user Xenix business system!



8 port, intelligent serial controller with 3% response degradation. Includes 8 MHz 80186 with built in DMA ..... **$1299**

## MICROWAY SOFTWARE FOR LOTUS 1-2-3™

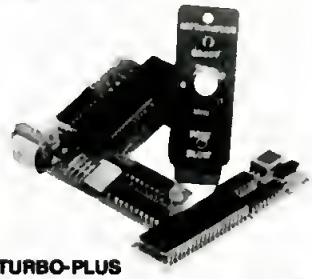
**FASTBREAK™** employs the 8087 to increase the speed of Lotus 1-2-3™ Version 1A or 1A*. Users are reporting speed ups of between 3 and 36 to 1. When run with our NUMBER SMASHER accelerator card, recalculation speed ups of 10 to 30 are being reported..... **$79**

**PowerDialer®** Add-In for Lotus 1-2-3 Release 2. Automated telephone dialing from within 1-2-3. Adds least cost routing, automatic carrier selection and automated phone book worksheet. Builds customized dialing applications. Can be used with DesqView ..... **$79**

**HOTLINK™** adds easy linking of spreadsheets to Lotus 1-2-3 Version 1A... **$99**

## 287 TURBO-PLUS™ Speeds up your AT

Adjustable 80286 Clock 6-12 MHz
10 MHz 80287 Clock
Plus Full Hardware Reset..... **$149**
Optional 80286-10..... **$175**



**287TURBO-PLUS**
With 80287 10 MHz..... **$549**
With 80287 12 MHz..... **$629**

## CALL (617) 746-7341 FOR OUR COMPLETE CATALOG

**MicroWay**
P.O. Box 79
Kingston, Mass.
02364 USA
(617) 746-7341

**You Can Talk To Us!**

**MicroWay Europe**
**32 High Street**
**Kingston-Upon-Thames**
**Surrey England KT1 1HL**
**Telephone: 01-541-5466**

## ■ PROGRAMMING/UTILITIES

```
700 DATA     1,   205,    22,   117,   185,   172,    60,    13,   775
790 DATA   110,   100,    60,    32,   116,   234,    60,    44,   844
800 DATA   116,   230,    60,    59,   116,   226,    60,    85,   952
810 DATA   117,    15,   199,     6,    80,     1,     0,     0,   418
820 DATA   199,     6,    82,     1,   255,   255,   233,   201,  1232
830 DATA     0,    60,    68,   117,    15,   199,     6,    80,   545
840 DATA     1,     0,     0,   199,     6,    82,     1,     1,   298
850 DATA     0,   233,   102,     0,    60,    76,   117,    15,   683
860 DATA   199,     6,    80,     1,   255,   255,   199,     6,  1001
870 DATA    82,     1,     0,     0,   233,   163,     0,    60,   539
880 DATA    82,   117,    15,   199,     6,    80,     1,     1,   501
890 DATA     0,   199,     6,    82,     1,     0,     0,   233,   521
900 DATA   144,     0,    60,    69,   117,    14,   199,     6,   609
910 DATA    80,     1,     1,     0,   199,     6,    82,     1,   370
920 DATA   255,   255,   235,   126,    60,    70,   117,    14,  1132
930 DATA   100,     6,    80,     1,     1,     0,   199,     6,   492
940 DATA    82,     1,     1,     0,   235,   100,    60,    71,   550
950 DATA   117,    14,   199,     6,    80,     1,   255,   255,   927
960 DATA   199,     6,    82,     1,     1,     0,   235,    90,   614
970 DATA    60,    72,   117,    14,   199,     6,    80,     1,   549
980 DATA   255,   255,   199,     6,    82,     1,   255,   255,  1300
990 DATA   235,    72,    60,    66,   117,     7,   190,     6,   761
1000 DATA  102,     1,     0,   235,    67,    60,    70,   117,   660
1010 DATA    7,   190,     6,   101,     1,     0,   235,    56,   604
1020 DATA   60,    67,   117,     0,   232,    18,     2,   162,   666
1030 DATA  100,     1,   235,    44,    60,    03,   117,     5,   645
1040 DATA  232,    41,     2,   235,    35,    60,    77,   117,   799
1050 DATA    5,   232,   109,     0,   235,    26,    60,    00,   747
1060 DATA  117,     5,   232,    54,     2,   235,    17,    60,   722
1070 DATA   75,   117,    13,   190,     6,    73,     1,     1,   484
1080 DATA  235,     6,   232,     6,     0,   232,   195,     1,   907
1090 DATA  233,   253,   254,   232,   146,     1,   232,   216,  1567
1100 DATA    1,    61,     0,     0,   116,    66,   232,   150,   634
1110 DATA    1,   139,    14,    00,     1,     3,    14,    74,   326
1120 DATA    1,   131,   249,     0,   114,    50,    59,    14,   610
1130 DATA   70,     1,   119,    44,   137,    14,    74,     1,   460
1140 DATA  139,    22,    82,     1,     3,    22,    76,     1,   346
1150 DATA  131,   250,     0,   114,    27,   129,   250,   199,  1100
1160 DATA    0,   119,    21,   137,    22,    76,     1,   120,   504
1170 DATA   62,   102,     1,     1,   117,     7,   160,   100,   550
1180 DATA    1,   100,    12,   205,    16,    75,   117,   193,   799
1190 DATA  195,   232,    27,     1,   115.    50,   199,     6,   025
1200 DATA   00,     1,     1,     0,   131,   253,     2,   117,   505
1210 DATA    0,   199,     6,    00,     1,   255,   255,   247,  1051
1220 DATA  216,   163,    00,     1,    70,   232,   255,     0,  1025
1230 DATA  199,     6,    82,     1,     1,     0,   131,   253,   673
1240 DATA    2,   117,     0,   199,     6,    82,     1,   255,   670
1250 DATA  255,   247,   216,   163,    90,     1,   235,    50,  1257
1260 DATA   43,     6,    74,     1,   199,     6,    00,     1,   410
1270 DATA    1,     0,   125,     0,   199,     6,    00,     1,   420
1280 DATA  255,   255,   247,   216,   163,    00,     1,    70,  1295
1290 DATA  232,   204,     0,    43,     6,    76,     1,   199,   761
1300 DATA    6,    82,     1,     1,     0,   125,     0,   199,   422
1310 DATA    6,    82,     1,   255,   255,   247,   216,   163,  1225
1320 DATA   90,     1,   232,   219,     0,   232,   239,     0,  1013
1330 DATA  161,    00,     1,    59,     6,    90,     1,   124,   530
1340 DATA    5,   232,     9,     0,   235,     3,   232,    01,   797
1350 DATA    0,   232,   239,     0,   195,   161,    00,     1,   916
1360 DATA  163,    96,     1,   255,     6,    96,     1,   209,   027
1370 DATA  232,   163,    92,     1,   199,     6,    94,     1,   700
1380 DATA    0,     0,   161,    02,     1,   163,    90,     1,   506
1390 DATA  235,     6,   107,     1,     0,   232,    25,   255,   941
1400 DATA  199,     6,    82,     1,     0,     0,   161,    90,   539
1410 DATA    1,     3,     6,    94,     1,   163,    94,     1,   363
1420 DATA   59,     6,    92,     1,   126,    13,    43,     6,   346
1430 DATA   00,     1,   163,    94,     1,   161,    90,     1,   607
1440 DATA  163,    02,     1,   255,    14,    96,     1,   117,   729
1450 DATA  209,   195,   161,    90,     1,   163,    96,     1,   916
1460 DATA  255,     6,    96,     1,   209,   232,   163,    94,  1056
1470 DATA    1,   199,     6,    92,     1,     0,     0,   161,   460
1480 DATA   00,     1,   163,    90,     1,   235,     6,   107,   771
1490 DATA    1,     0,   232,   204,   254,   190,     6,    00,   076
1500 DATA    1,     0,     0,   161,    00,     1,     3,     6,   260
1510 DATA   92,     1,   163,    92,     1,    59,     6,    94,   500
1520 DATA    1,   126,    13,    43,     6,    90,     1,   163,   443
1530 DATA   92,     1,   161,    90,     1,   163,    00,     1,   597
1540 DATA  255,    14,    96,     1,   117,   209,   195,    51,   930
1550 DATA  237,   120,    60,    43,   117,     6,    70,   109,   050
1560 DATA    1,     0,   235,     9,   120,    60,    45,   117,   595
1570 DATA    4,    70,   109,     2,     0,   232,    09,     0,   506
1580 DATA  131,   253,     2,   117,     2,   247,   216,   131,  1099
1590 DATA  253,     0,   117,     2,   240,   195,   249,   195,  1259
1600 DATA  120,    62,   102,     1,     1,   117,    15,   139,   565
1610 DATA   22,    76,     1,   139,    14,    74,     1,   160,   407
1620 DATA  100,     1,   100,    12,   205,    16,   195,   120,   037
1630 DATA   62,   101,     1,     1,   116,    12,   161,    74,   520
1640 DATA    1,   163,    04,     1,   161,    76,     1,   163,   650
1650 DATA   06,     1,   195,   190,     6,   102,     1,     1,   590
```

*(Figure 2 continues)*

Both the power and the programming interest in DRAW lie in its M (move) and P (paint) commands. The M command uses Bresenham's algorithm, and P uses a recursive algorithm adapted from a Pascal program written by William F. Polik.

**MASTERY OF LINE** Let's take the M command first. DRAW looks to see if the first character that follows an M is either a plus or a minus sign. If so, DRAW assigns

■ The power and programming interest in DRAW lie in its move and paint commands, which use, respectively, Bresenham's algorithm and recursion.

the following number to a variable, delta *x*. The command string pointer (SI) is bumped past the delimiting comma, and the next number is assigned to another variable, delta *y*.

If the *x* coordinate is not signed, the move is considered to be absolute instead of relative. If absolute, the deltas are assigned the difference between the current position and the targeted new coordinates.

As presented above, it's a simple feat to draw diagonal lines that have a slope of 1, that is, for each move in the *x* direction there is an equal move in the *y* direction. If you remember your geometry, the formula for a diagonal line is

$$y = mx + b$$

where *m* is the slope and *b* is a constant. The slope is a ratio of the move on the *y* axis relative to the number of moves on the *x* axis. This is the delta *x* and delta *y* that DRAW calculated above. If the command to move was M5,3, then delta *x* would be 5, delta *y* would be 3, and the slope would be 3/5. For each change in the *x*, the position of *y* would be calculated by multiplying by 3 and dividing by 5. The result is rounded off (remember, we can plot only

# Bulldog pulls in Spring with a Wave of Specials!

## IBM

### XT SYSTEMS

640 K, 1 Drive, 10 mb Hard Disk ..... **$1375**
640 K, 1 Drive, 20 mb Hard Disk ..... **1425**
640 K, 1 Drive, 20 mb Hard Disk Monochrome Monitor & Card ..... **1615**
640 K, 1 Drive, 20 mb Hard Disk Color Monitor & Card ..... **1815**

### AT SYSTEMS

Model 339 ..... **$3950**
AT BASIC 256 K, 1.2 mb Floppy ..... **2350**
512 K, 20 mb Hard Disk 1.2 Floppy ..... **2695**
512 K, 20 mb Hard Disk 1.2 Floppy Monochrome Monitor & Card ..... **2895**
512 K, 30 mb Seagate Hard Disk 1.2 Floppy ..... **2889**

## COMPATIBLE

### PC II TURBO XT

8 mhz, 1 floppy, 640K, AT style keyboard, game port, clock calendar, monographics card, mono monitor, DOS & manuals ..... **$849**
Color System add $200
w/20 mb add $359
w/30 mb add $425

### CLUB AT

10 mhz, 1.2 floppy, 1 mb Ram memory, hi res, mono graphics, monochrome monitor, clock calendar ..... **$1495**
Color system add $200
w/30 mb add $539
w/40 mb add $595

*Let us customize a system to fit your special needs — tell our sales staff what you want and Bulldog will take the byte out of building your system!*

## PORTABLES

IBM Convertible ..... **$1495**
Compaq II Model II ..... **2725**
Zenith Z181 ..... **1795**
Toshiba T 1100 Plus w/640K ..... **1650**
Toshiba 3100 ..... **3175**
NEC Multispeed ..... **CALL**

## AT&T SYSTEMS

6300

2 Drive System ..... **$1359**
10 mb System ..... **1595**
20 mb System ..... **1695**
Upgrade to 640K ..... **50**

Systems include Keyboard, Bit Image Graphics, Green Monitor, 256K DOS, and On-Board Clock Calendar.

AT&T Color Monitor ..... **675**

## MISCELLANEOUS

KODAK DATA SHOW ..... **$1050**
KENSINGTON Masterpiece/Plus ..... **129**
MICROFAZER w/8K ..... **129**
MICROFAZER II w/512K ..... **309**
MICROSOFT MOUSE w/PC paint brush ..... **119**
POLAROID PALETTE ..... **1389**
35mm EXPRESS ..... **450**
MATH CO-PROCESSORS ..... **CALL**

## GRAPHICS CARDS

EVEREX EGA ..... **$195**
EVEREX THE EDGE ..... **219**
GENOA EGA ..... **299**
GENOA SPECTRUM ..... **199**
HERCULES GRAPHICS ..... **189**
ORCHID TURBO EGA ..... **565**
PARADISE EGA Auto Switch ..... **355**
QUADRAM EGA ..... **309**
QUAD PRO SYNC ..... **399**
SIGMA COLOR 400 ..... **399**
NEC GB-1 Multisync ..... **389**
STB EGA PLUS ..... **269**
VEGA DELUXE ..... **359**

## MULTI FUNCTION BOARDS

AST Advantage w/128K ..... **$329**
AST Advantage Premium w/512K ..... **449**
AST 6 PACK PLUS w/384K ..... **189**
AST 6 PACK PREMIUM w/256K ..... **199**
AST 5251-11 PLUS ..... **615**
AST FLASHPACK ..... **289**
AST RAMPAGE for AT w/512K ..... **425**
AST RAMPAGE EGA ..... **699**
EVEREX MAGIC CARD II w/384K ..... **159**
EVEREX MINI MAGIC w/o K ..... **69**
INTEL Above Board for AT w/128K ..... **349**
INTEL Above Board PS for AT w/128K ..... **369**
INTEL Above Board for PC w/256K ..... **295**
INTEL Above Board PS for PC w/64K ..... **229**
IRMA BOARD ..... **699**
J RAM III for PC w/o K ..... **199**
J RAM III for AT w/o K ..... **249**
J LASER PLUS PC/AT ..... **489/589**
ORCHID JET 386 ..... **849**
ORCHID PC NET STARTER KIT ..... **735**
ORCHID TINY TURBO 286 ..... **389**

## Sales Hot Line 1-800-438-6039

# BULLDOG

COMPUTER PRODUCTS

We accept VISA, MasterCard, American Express

**3241-E Washington Road • Martinez, Georgia 30907**

***Incorporated as Georgia Micro***

RETURN POLICY
Returned items must be in original packaging, with all warranty cards & manuals intact. No credit issued after 30 days from date of shipment. We do not guarantee compatability. All returned items must have a return authorizaton number assigned.

# Bulldog Weeds Out High Prices From A Field of Great Buys!

## SOFTWARE

| | |
|---|---|
| Chartmaster | $209 |
| Clipper | 349 |
| Cornerstone | 69 |
| Crosstalk XVI | 99 |
| D Base II | 299 |
| D Base III | 399 |
| Dollars & Sense | 99 |
| Easy Extra | 89 |
| Enable | 349 |
| Fastback | 89 |
| Freelance Plus | 339 |
| Framework | 399 |
| IBM Display Write IV | 369 |
| Lotus | 319 |
| Lotus Hal | 109 |
| Managing Your Money 3.0 | 105 |
| Microsoft Quick Basic | 69 |
| Microsoft Window | 69 |
| Microsoft Word 3.1 | 279 |
| Multimate 3.31 | 239 |
| Multimate Advantage | 319 |
| Multiplan | 119 |
| Norton Commander | 49 |
| Norton Utilities | 59 |
| Office Writer 5.0 | 259 |
| Open Access II | 329 |
| PFS Professor Write | 149 |
| PFS Professor File | 159 |
| PFS 1st Choice | 99 |
| Q & A | 259 |
| Quick Code III | 145 |
| Quick Report | 145 |
| Rapid File | 259 |
| R Base System V 1.0 | 349 |
| Reflex | 99 |
| Revelation | 575 |
| Squeeze | 59 |
| Super Calc IV 1.0 | 269 |
| Sylvia Porter Swiftax | 49 |
| Symphony 1.2 | 439 |
| Turbo Lightning w/Word Wizard | 89 |
| Turbo Prologue | 59 |
| Volkswriter III | 149 |
| Ventura Desktop Publ. | 575 |
| V.P. Planner | 59 |
| Word Perfect 4.2 | 205 |
| Word Perfect Library | 59 |
| Wordstar 2000 | 249 |
| Wordstar 2000 + | 279 |

## HARD DRIVES

| | |
|---|---|
| Seagate 10mb w/contr. ST213 | $325 |
| Seagate 20mb w/contr. ST225 | 359 |
| Seagate 30mb w/contr. ST238 | 425 |
| Seagate 20 mb for AT ST4026 | 495 |
| Seagate 30 mb for AT ST4038 | 539 |
| Seagate 40 mb for AT ST4051 | 595 |
| Seagate 80 mb for AT ST4096 | 949 |
| IOMEGA BERNOULLI | |
| 10 mb w/card | 1350 |
| 10 + 10 w/card | 1925 |
| 20 + 20 w/card | 2425 |
| BERNOULLI PLUS | 3750 |
| SYSGEN Durapack single | 995 |
| dual ext./int. | 1850/1595 |
| Mountain 20 mb drive card | 649 |
| Western Digi. 30 mb drive card | 649 |
| Western Digi. 20 mb drive card | 625 |
| Plus Hard Card 10 | 459 |
| Plus Hard Card 20 | 625 |
| Priam 60 mb AT | 1025 |
| Priam 43 mb AT | 789 |

## MODEMS

| | |
|---|---|
| Everex 1200/2400 | $109/225 |
| Hayes 1200B/1200 | 315/345 |
| Hayes 2400 int/ext | 479/539 |
| US Robotics 2400 direct internal | 189 |
| Ventel Half Card 1200 w/Crosstalk | 259 |
| Vental Half Card 2400 w/Crosstalk | 369 |
| Ventel 1200 Plus | 239 |
| Ventel 2400 Plus | 369 |

## MONITORS

### AMDEK

| | |
|---|---|
| 310-A | $149 |
| Color 600 | 400 |
| Color 722 | 495 |

### PRINCETON

| | |
|---|---|
| MAX12 | 159 |
| HX12 | 419 |
| HX12E | 495 |

### TAXAN

| | |
|---|---|
| T124 Amber | 109 |
| 840 | 799 |
| 720 | 349 |
| 635 | 450 |
| 650 | 519 |
| **SONY Multi Scan** | 629 |
| **NEC** Multisync | 559 |

## PRINTERS

### EPSON

| | |
|---|---|
| LX 86 120 CPS, 16 NLQ | $199 |
| FX 86E 200 CPS, 40 NLQ | 369 |
| FX 286E 200 CPS, 40 NLQ | 499 |
| LQ 800 180 CPS, 60 NLQ | 459 |
| LQ 1000 180 CPS, 60 NLQ | 639 |
| LQ 2500 324 CPS, 108 NLQ | 1015 |
| EX 800 300 CPS, 60 NLQ | 439 |
| EX 1000 | 559 |
| DX 35 Daisywheel | 559 |

### OKIDATA

| | |
|---|---|
| 182 120 CPS | 229 |
| 192 Plus 200 CPS | 359 |
| 193 Plus 200 CPS | 535 |
| 292 Plus 200 CPS, 100 NLQ | 549 |
| 293 Plus 200 CPS, 100 NLQ | 675 |
| 294 Plus 400 CPS | 1095 |
| Laser Line 6 | 1599 |

### TOSHIBA

| | |
|---|---|
| 321 180 CPS, 60 NLQ | 449 |
| 351 II 300 CPS, 100 NLQ | 949 |
| 341 180 CPS, 72 NLQ | 629 |
| 351 Color 240 CPS, 100 NLQ | 1150 |

### NEC

| | |
|---|---|
| SPECIAL PRICING | CALL |

### PRIMAGE 90

| | |
|---|---|
| w/Pagemate III 90 CPS Daisywheel | 1550 |

### FUJITSU

| | |
|---|---|
| 2100/2200 220 CPS 44 CPS | 349/459 |
| 2400/2400 Color 216 CPS 72 CPS | 779/899 |
| DLP24 288 CPS, 96 CPS | 865 |

## TAPE DRIVES

| | |
|---|---|
| Everex 60 m.b. internal | $710 |
| external | 895 |
| Everex 20 mb internal | 525 |
| external | 595 |
| Genoa Galaxy 60 mb internal | 739 |
| external | 869 |
| Genoa Galaxy 20 mb internal | 589 |
| external | 695 |
| Sysgen Quic 60 internal | 949 |
| external | 995 |
| Sysgen 20 mb internal | 575 |
| external | 650 |
| Tallgrass 20 mb int/ext | 395/550 |
| Tallgrass 20 mb internal tape plus 25 mb hard disk | 995 |
| Tallgrass 60 mb external tape | 1050 |

Prices Subject To Change

**For Orders Call: 1-800-438-6039**

**For Shipping Call: 404-860-6905, For Returns Call: 404-860-6899**

**And In Georgia Call: 404-860-7364**

# BULLDOG

COMPUTER PRODUCTS

*Incorporated as Georgia Micro*

CIRCLE 481 ON READER SERVICE CARD

**FREE CONSULTATION!**

**EGA Cards**

ATI EGA Wonder .....299
Number Nine ..... CALL
Paradise Autoswitch .....399
Orchid ..... ALL
VEGA Video 7 .....349

**Memory**

**AMI ELEPHANT** 10 & 12 MHz!!
HARDRAM
Non Volatile EMS .... 359
Tall Tree ..... LOWEST!
Maynard ON-Board .... 695
Maynard Maynstream (20) 695
Maynard Mouse ..... 149

**Accelerator Boards**

Maynard Surprise! ..... 119
Surprise 286 .....399
Megahertz TurboSwitch .. 125
MicroWay ..... ALL
Orchid ..... CALL
Ariel ..... CALL

**Software**

Above Disc .....89
DOS 200LS .....89
STSC APL .....395
Statistics
Statgraphics .....595
Execustat .....369

**Desktop Publishing**

Dr. Halo DPE ..... 175
Fancy Font .....165
JLaser+ .....NEW!
Laser GL .....75
LePrint Extended .....249
Page Builder .....350

**PCB Layout**

Omation Schema .....399
P Spice ..... CALL
Wintek smARTWORK ... 849

Call for many products not listed.

ADVANCEDWARE™
276 A Victoria Street
Costa Mesa, CA 92627
(714) 722-6700

Shipping from East & West coast

CIRCLE 357 ON READER SERVICE CARD



## ■ PROGRAMMING/UTILITIES

```
1660 DATA  120,   62,  101,    1,    1,  116,   17,  161,  587
1670 DATA   86,    1,  163,   76,    1,  161,   84,    1,  573
1680 DATA  163,   74,    1,  100,    6,  101,    1,    1,  545
1690 DATA  105,   51,  210,  120,   60,   48,  114,   25,  840
1700 DATA  120,   60,   57,  110,   20,  172,   44,   48,  648
1710 DATA  138,  200,  184,   10,    0,   51,  210,  247, 1040
1720 DATA  227,  130,  216,   50,  237,    3,  217,  235, 1324
1730 DATA  226,  130,  105,  105,   30,  232,  217,  255, 1480
1740 DATA   51,  210,  105,    0,  104,  142,  217,  106, 1104
1750 DATA    2,    0,  105,    0,   32,  136,    7,   67,  420
1760 DATA  226,  251,  200,  200,  200,  200,   74,  117, 1404
1770 DATA  241,   31,  105,  232,  107,  255,   50,    6, 1205
1780 DATA  104,    1,  110,  123,  162,  103,    1,   70,  683
1790 DATA  232,  174,  255,   50,    6,  104,    1,  110,  940
1800 DATA  110,  162,  105,    1,  139,   22,   76,    1,  616
1810 DATA  130,   14,   74,    1,  232,   70,    1,  114,  653
1820 DATA   94,   50,    6,  105,    1,  116,   00,  130,  607
1830 DATA  217,   73,  232,   64,    1,  114,   10,   50,  760
1840 DATA    6,  105,    1,  116,    4,  130,  217,  235,  823
1850 DATA  240,  137,   30,  106,    1,   83,  130,   14,  758
1860 DATA   74,    1,  130,  217,   65,  232,   37,    1,  766
1870 DATA  114,   10,   50,    6,  105,    1,  116,    4,  414
1880 DATA  130,  217,  235,  240,  137,   30,  100,    1, 1107
1890 DATA   83,   43,   30,  106,    1,   67,  130,   14,  483
1900 DATA  106,    1,  160,  103,    1,  100,   12,  205,  760
1910 DATA   16,   65,   75,  117,  245,   02,   74,  232,  006
1920 DATA   14,    0,   00,   66,   00,  163,  100,    1,  530
1930 DATA   00,  163,  106,    1,  232,    1,    0,  105,  786
1940 DATA  130,   14,  106,    1,  137,   14,  110,    1,  522
1950 DATA  130,   14,  110,    1,  232,  222,    0,  115,  833
1960 DATA    3,  233,  216,    0,   50,    6,  105,    1,  622
1970 DATA  116,   34,   50,    6,  103,    1,  116,   20,  462
1980 DATA  137,   14,  112,    1,  130,  217,   73,  232,  025
1990 DATA  105,    0,  114,   10,   50,    6,  105,    1,  480
2000 DATA  116,    4,  130,  217,  235,  240,  137,   30, 1110
2010 DATA  110,    1,  235,   35,   65,   50,   14,  100,  627
2020 DATA    1,  127,   20,  232,  167,    0,  114,   15,  676
2030 DATA   50,    6,  103,    1,  116,    6,   50,    6,  354
2040 DATA  105,    1,  117,    3,   65,  235,  230,  137,  003
2050 DATA   14,  110,    1,  137,   14,  112,    1,  130,  520
2060 DATA   30,  110,    1,   50,   30,  100,    1,  126,  465
2070 DATA    3,  233,  120,    0,  130,   30,  112,    1,  646
2080 DATA  130,  203,   65,  232,  110,    0,  114,   10,  002
2090 DATA   50,    6,  105,    1,  116,    4,  130,  217,  646
2100 DATA  235,  240,  137,   30,  112,    1,  130,   14,  008
2110 DATA  110,    1,   43,  217,   67,  160,  103,    1,  702
2120 DATA  100,   12,  205,   16,   65,   75,  117,  245,  015
2130 DATA  255,   54,  106,    1,  255,   54,  100,    1,  034
2140 DATA  139,   14,  110,    1,   01,  137,   14,  106,  002
2150 DATA    1,  130,   14,  112,    1,   01,  137,   14,  400
2160 DATA  100,    1,   02,   74,  232,   73,  255,   00,  015
2170 DATA   09,  137,   14,  100,    1,  137,   14,  112,  612
2180 DATA    1,   00,  163,  106,    1,  163,  110,    1,  633
2190 DATA   01,   02,   66,  232,   50,  255,   00,   00,  045
2200 DATA  137,   14,  112,    1,  131,  103,    2,  137,  727
2210 DATA   14,  110,    1,  143,    6,  100,    1,  143,  526
2220 DATA    6,  106,    1,   50,   14,  100,    1,  127,  422
2230 DATA    3,  233,   20,  255,  105,  131,  240,    0, 1004
2240 DATA  114,   23,   50,   14,   78,    1,  110,   17,  425
2250 DATA  131,  250,    0,  114,   12,  120,  250,  100, 1085
2260 DATA    0,  110,    6,  100,   13,  205,   16,  240,  787
2270 DATA  105,  176,  255,  240,  105,    0,    0,    0, 1070
```

*(Figure 2 ends)*

integers), and the dot is plotted.

Unfortunately, however, because of both the slow execution speed of the MUL and DIV instructions and the difficulty in dealing with floating-point numbers, this method would result in drawing lines at what Oregonians would call a slug's pace.

Bresenham, however, came up with a shortcut to avoid the slow fractional calculations. In his algorithm, half $x$ is defined as a constant that is the quotient, expressed as an integer, of delta $x$ divided by 2. In our example, half $x$ will be $^5/_2$ or 2. A variable called the error term is used to keep track of where the dot would be plotted if we were able to plot fractional pixels, and of where the dot is actually plotted.

Continuing our example, then, $x$ is changed five times, and three changes of $y$ have to be divided up in those five moves. In the first increment of $x$, delta $y$ is added to the original error term of 0. If the new error term, now 3, is less than or equal to half $x$ (which is 2), $y$ will not be changed before plotting. If it is greater than half $x$ (and in this case it is), $y$ will be changed by one. When $y$ is changed, the error term is adjusted by subtracting delta $x$ from the error term ($3 - 5 = -2$).

In preparation for plotting the next point, $x$ is incremented and 3 is again added to the error term ($-2 + 3 = 1$). This

```
X0 R255 C0

' Illustrated by David P. Ritt

BM45,90 M-11,-11 M+4,-0 U3 M+6,-0 M+42,-16 R15 M+21,7 M+10,9 M+6,2 M+4,5
M-1,17 M-0,7 M-4,15 P1D4G1D2G1D7 M-7,12 M-1,10 G1 M-9,3 L8 M-E,-6 M-10,-0
R1 M-4,-12 M-6,-3 M-6,-7 U5 M-7,-1 U5 M-3,-5 M-3,-5 M+12,-10 M+23,-0 M+16,-3
M20 M+1E,6 NM+1,11 L11R1L27 M-13,3 M-19,6 NM+7,-7 M-15,12
BM+34,-18 M-12,13 M+15,-4 NM+9,-12 P1 RM+0,-5 NE5 M+11,-4 M-1,4 M+7,-4M-6,9
M+10,-13 M+5,7 M+0,4 D6F1

BM59,106  M+9,0 R1 M-2,-12 M+11,-13
BM59,106  M+7,-4
BM77,100  R2E2R2U1NR14R4D1R11D1
BM03,104  E3R10F2L4G1L3R1U1L1G2L2BE1 P0,0
BME0,100  R6E2
BM100,100  U1E1R1E3R1E1R10P2D3P1D5
BM109,101  R4U3E2M3E1R5L9BG2 P0,0
BM114,99   R1E1R5F2ND1L3G1L3M1L1
BM117,104 F1R1U1R1E1R1
BM109,103  M+1,0 F1D1R1ND2R2F2G1D2L2D1L1D1L2G1L2M1L1U1L3N1G1
BM116,11  0F2R1P1D4L6G1L9G1L9
BM116,125 G4L4G1L4H1
BM110,120 NG5G1D2G1D1G1L7G1L4B1L1BR13BU1 P0,0
BM116,130 D1
BME9,125  U2E2R1U1R1U1E1H1U1
BM81,11E  D4P1D1P3D1P4D1P1
BM90,103  P0,0
BM116,100 P0,0
BM75,134  M+9,35 M+6,-7 NM+5,-6 M+E,12 NM-5,7 R1P1R1ND6N2E1R1E1 NM+5,6
M+5,-10 NM+5,4 M-12,-9 NM+9,-6 M-5,2 M-19,-21
BM119,146 M-2,21
BM65,11E NM-14,6D14
BM105,170 P0,0
BM102,152 H11R1P3RP1 P0,0

RM167,65 L5 M-15,-4 B1U2E1 M+20,-6 M+7,-1 M+0,-16 R1 M+14,-19 M+33,3 M+31,19
M+7,0 M-4,14 D11 M+20,4 M-1,4 M-23,5 M-26,-17 L1R1L1N1L2H1L2H1L1R1L2B1L3R1L3
H1L5N1L21 M-15,3 M-2,5
BM103,34 M+23,3 M+23,7 NM-5,4 M+10,6 NM+1,6 M+17,0
BM174,50 R19 M+29,4 RM+2,-6 M+21,0 NM+5,-5 M+22,0
BM167,65 NM+6,6 G1D2 M+5,5 NE1 M-6,14 G1D2P1R1P1R14P1R2P1NL3R1P1L4B1L0B1L1
D2P1R2ND3R7P1R0L3D1L1G1L1G1L0R5D1G1L3G1 M-4,0 G1D2P2R2P1R3P1R5E1R1E1H4
M+25,-11 M+9,-11 R4E1R2E7 M+2,-0 H3L1H1L6G2D3P1R3E2R2P1D5G3L1
BU4L2E1N1BM-2,4R2BD4D1R1
BM261,03 D1G1D1 M-46,50 M-25,-23 R4 BM+4,4 M+24,-13 L2G2L2G1L2D1L1BG1 P0,0
BM236,90 M+0,11 R3
BM229,70 M-9,5 M-10,-3 M+3,-7 M-6,-4 M-4,-12
BM179,75 E1N1L1H3U3E1F1R10P2D2R1L2R1L0D1R4P1R2P2R1L5D1R7P1M1L10U3
BM103,76 D2R5E1BH7R6E1R1
BM180,00 G2L5E1R4 RM+7,1 P6D5 BM+6,-0 D1P2D4 M-5,6 BM+10,-9 U4
BM175,93 P0,0
RM175,106 R3E1R2E1R1

BM175,100 L12G1L9G1D2P1R17U1R5BB1 P0,0
BM247,102 M+12,7 NM+15,6 M-14,53
BM156,112 L4 M-21,-3 NU9D16G1D3 M-9,12 M+7,-2 1G2D2
BM122,137 U4R1U1R1U2
BM194,126 D4NG0D25 M+7,-3 D19BL1 P0,0
BM200,13E G2D1G2D4
BM230,159 M-14,-12 L6 M+5,-6 M+15,17 B3L1BN1 P0,0
BM169,70 P0,0 BR9 P0,0
BM215,69 P3H0H3L0 BL1 P0,0
BM55,70 P2,0 BM55,05 P2,0 RM05,74 P2,0 BM69,77 P2,0
BM195,30 P1,0 BM195,40 P1,0 BM235,50 P1,0 8M255,60 P1,0 BM165,53 P1,0
BM151,101 M-14,-1 U1 M+20,-5 U1 M-9,-3
```

**Figure 3:** *CONMEN.DAT, a sample data file for DRAW.COM.*

time the error term is less than half *x* so *y* is not changed. On the third loop, when 3 is added to the error term of 1, it becomes 4 and, since that is greater than half *x*, *y* is changed and the error term is adjusted to $-4\,(1-5=-4)$. This is repeated until all 5 units of delta *x* have been plotted along the line.

For slopes less than 1, *x* is changed at each iteration of the loop, and *y* changes when it meets the rules of the error term. For slopes greater than or equal to 1, the reverse is tested. *y* is changed each loop, and *x* is changed depending on the error term. That is, half *y* becomes the constant, delta *x* is what is added to the error term, and *x* is changed if and when the error term is greater than half *y*. The end result in either case is the plotting of a symmetrically stepped line.

Bresenham's algorithm is a little tricky, but the recursive fill algorithm is more so. A recursive algorithm is a subroutine that does some calculations and then, if need be, solves the rest of the problem by calling on itself. This results in nested calls that are placed on the stack until (in the fill algorithm) a boundary is reached. Then the nested calls are backed off the stack one by one until you get back to the starting point once again.

**SHADOWY TECHNIQUE** Sound confusing? It goes something like this. DRAW starts by looking to the left of the current starting coordinates until it sees either a boundary color (INT 10H, function 0DH, read dot) or the edge of the screen. It also looks to the right to find the end of a run. A "run" is thus defined as the points on a row that need to be filled, bordered at each end by the border color or the edge of the screen. This is the parent run, which is filled by using INT 10H's write dot. Each run is thought to have two "shadows," one above the current row and one below. A shadow is a run that neighbors and overlaps the parent run. For every parent row there are therefore the two shadows, one up and one down.

■ A recursive algorithm is a subroutine that does some calculations and then, if need be, solves the rest of the problem by calling on itself.

Suppose, then, we have a parent row and its two shadows that look like this:

```
Row 1   B3xxxx4BB5xxxx6B
Row 2   BBBB1xxxxxxx2BBB
Row 3   BBBBBB7xxxx8BBBB
```

where B is the border color and the x's and numbers are anything other than the fill color—in other words, places that need to

# BATCH FILE APPLICATIONS

If you have PLAY and the sample data file, STING.DAT (contained in the last issue), you can create a simple batch file that will tie the song with DRAW and its sample data file, CONMEN.DAT (shown in Figure 3). Create the batch file (STING.BAT) that follows with an ASCII word processor, or, if you don't have one, from the DOS prompt enter

```
COPY CON: STING.BAT
```

Then enter the three lines that make up the batch file. If using COPY:CON, you must also then press F6 and return.

```
DRAW CONMEN.DAT/F
PLAY STING.DAT/F
MODE CO8Ø
```

You now will have the batch file to draw the con men and then play the theme from *The Sting*. Be sure both data files are in the current directory or add a path so DRAW and PLAY can find the file. Then enter STING. The last command in the batch file, MODE CO80, changes back to 80-column text before exiting.

Here's an example of how you might use the DRAW and PLAY for demonstration purposes. Create the batch file DEMO.BAT the same way you made STING.BAT.

```
BREAK OFF
ECHO OFF
:START
DRAW LOGO/F/K
PLAY SONG/F/K
GOTO START
```

LOGO is a file you would create containing the command sequence for drawing your company logo. Similarly, SONG would play the company ditty. The /K tells both programs to ignore the keyboard. This will keep any idle fingers from breaking out of the batch file prematurely by fooling with the keyboard. When the song is finished playing, the batch file will branch back to the start and repeat it over and over again. The only way to break out of this batch file is to reboot with Ctrl-Alt-Del. [*That's why I'd leave the /K out.—Ed.*]

While it's sometimes fun to watch DRAW paint the screen, if you'd prefer to have your pictures pop full-blown onto the screen, I've provided four other short programs (which are used in concert) to accomplish this. The first two are BSAVE and BLOAD, which are similar to their counterparts in BASIC. The syntax for these programs is

```
BSAVE filespec
```

and

```
BLOAD filespec
```

BSAVE saves a byte image of the screen buffer, and BLOAD writes the saved image back to the screen buffer. To create BSAVE and BLOAD, first create the two script files shown as Figure A and Figure B with an ASCII word processor, such as EDLIN.

To create the executable files, you then enter

```
DEBUG < BSAVE.SCR
```

and

```
DEBUG < BLOAD.SCR
```

Note that BSAVE and BLOAD will save text screens as well as graphic screens. To use BLOAD and BSAVE with the graphic example, you will need two other short programs to change to the appro-

```
N       BSAVE.COM
A
XOR     BH,BH
MOV     BL,[80]                 ;Get argument length.
MOV     Byte Ptr [BX+81],0      ;Convert argument to ASCIIZ.
MOV     DX,82
MOV     CX,0
MOV     AH,3C                   ;Create a normal file.
INT     21
JB      140                     ;Exit if error.
MOV     BX,AX                   ;Else, filehandle in BX.
MOV     AX,40
MOV     DS,AX                   ;BIOS data segment.
MOV     AX,B000                 ;Monochrome buffer address.
MOV     CX,1000                 ;4K buffer.
CMP     Word Ptr [63],3B4       ;Is it monochrome?
JZ      133                     ;If yes, skip around.
ADD     AX,800                  ;Else, CGA buffer address.
ADD     CX,3000                 ;16K buffer.
MOV     DS,AX                   ;Point to segment.
MOV     DX,0                    ;Point to offset.
MOV     AH,40                   ;Write image to file.
INT     21
MOV     AH,3E                   ;Close the file.
INT     21
INT     20                      ;Terminate.

RCX
42
W
Q
```

**Figure A:** *A DEBUG script file to create BSAVE.COM.*

be filled. The center row is the parent. In this example, the top shadow has two runs that need to be filled and the bottom shadow, one.

After DRAW fills from border to border (1–2) on the parent row, it looks up at the first shadow. For each shadow, the starting leftmost point is first found. That will be point 3. Then the rightmost point of the run is found, point 4. After this run is filled, it becomes a parent and inherits two shadows of its own. The same subroutine is called with the new starting left position, point 3, and a new ending right position, point 4. This is the recursive part of the algorithm. The upper shadow is looked at in the same manner and becomes a parent, bearing its shadows. This continues until either an upper shadow is found with no runs to be filled or the edge of the screen is encountered.

Each call and its variables are backed off the stack until we return to the upper shadow (row 1). Its next leftmost point

```
N       BLDAD.COM
A
XOR     BH,BH
MOV     BL,[80]                 ;Get argument length.
MOV     Byte Ptr [BX+81],0      ;Convert argument to ASCIIZ.
MOV     DX,82
MOV     AX,3D00                 ;Open file for reading.
INT     21
JB      13E                     ;Exit if not found.
MOV     BX,AX                   ;Else, filehandle in BX.
MOV     AX,40
MOV     DS,AX                   ;BIOS data segment.
MOV     AX,B000                 ;Monochrome buffer address.
MOV     CX,1000                 ;4K buffer.
CMP     Word Ptr [63],3B4       ;Is it monochrome?
JZ      131                     ;If yes, skip around.
ADD     AX,800                  ;Else, CGA buffer address.
ADD     CX,3000                 ;16K buffer.
MOV     DS,AX                   ;Point to segment.
MOV     DX,0                    ;Point to Offset.
MOV     AH,3F                   ;Read in file image.
INT     21
MOV     AH,3E                   ;Close file.
INT     21
INT     20                      ;Terminate.

RCX
40
W
Q
```

**Figure B:** *A similar DEBUG script file for the complementary BLOAD.COM.*

priate graphics mode. The first program changes the display mode to low resolution and the second to high resolution. The script files can be created in the same manner, or, since they're so short, you may wish to load DEBUG and key in the commands directly. For LOWRES, you would enter

```
N    LOWRES.COM
A
MOV  AX,4
INT  10
INT  20

RCX
7
W
Q
```

Similarly, for HIGHRES, enter

```
N    HIGHRES.COM
A
MOV  AX,6
INT  10
INT  20

RCX
7
W
Q
```

Once you have these four .COM files, you are ready to create a batch file named SAVE.BAT, consisting of the lines

```
ECHO OFF
DRAW CONMEN.DAT/F
BSAVE PICTURE
```

This batch file will draw the con men and save them in a file named PICTURE.

Finally, create the batch file to retrieve your picture, INSTANT.BAT:

```
ECHO OFF
LOWRES
BLOAD PICTURE
PAUSE > NUL
MODE CO80
```

This batch file changes to low-resolution graphics mode, loads an image of the picture, and then pauses so that DOS will not spoil the picture with the prompt. Any keystroke will then clear the screen back to 80-column text. Note the redirection of the Pause prompt "Strike a key when ready . . ." to the null device. Suppression of the prompt will not work with versions of DOS earlier than DOS 3. If this is a problem, you can substitute the key polling program, GETKEY (User-to-User, Volume 4 Number 6). Use HIGHRES with pictures that were drawn in high resolution.

As mentioned above, BSAVE and BLOAD can be used with text screens. If you have, for example, a batch file that displays a menu with the painfully slow ECHO command, you can add the BSAVE command at the end of the menu and then change the batch file so BLOAD will instantly load your menu. The two batch files might look something like this:

MENUSAVE.BAT

```
ECHO      < use the current text
ECHO       from your menu here>
BSAVE MENU
```

NEWMENU.BAT

```
BLOAD MENU
```

You now have a whole arsenal of programs to add to your batch file repertoire. Have fun customizing a batch file to meet your needs.—**Michael J. Mefford**

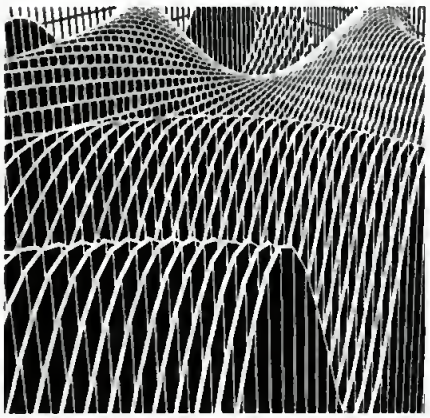
(point 5) is found as is its rightmost (point 6), and the run is filled. This run becomes a parent, and we start looking up again. This continues as long as the next possible leftmost is not past the parent's ending right. For row 1, that will be point 2 of row 2. When we once again return to row 1 and all its runs are found filled, control is passed back to the original parent, row 2. Now the whole process repeats, this time looking down, starting with its lower shadow, which is row 3.

Still sound confusing? Well, the nice thing about a computer is it can keep track of all this kind of mess without flinching, while we need only say P2,3 (paint green until you reach a red border). And if there's a Rembrandt dormant somewhere in the catacombs of your creative mind, now that you have DRAW, bring him to life on the canvas of your computer.

*Michael J. Mefford is a contributing editor of* PC Magazine.

# 2.0 ENABLE

**Every now and then in the software industry something momentous comes along and changes attitudes overnight. The introduction of Enable 2.0 (with a LAN version, and now available on 3½" disks) promises to be one of those events.**



## Enable with Perspective.™ Talk about something to get excited about!

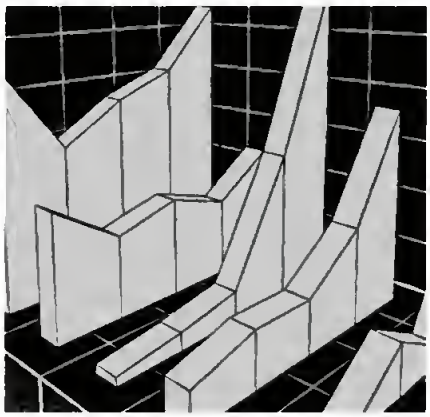
Perspective. *The* graphics package. As *Personal Computing* just wrote, "other products cannot even come close."

Now, Perspective is fully bundled in Enable 2.0. Which means you can now have an integrated system beyond all others. Word processing, spreadsheet, DBMS, communications and mind-boggling graphics all in one. All offering the power business users need (for confirmation, just read our "Raves" column to your right).

And what Perspective offers is truly awesome:

- 15 2-D and 32 3-D graphs from Enable's spreadsheet or database
- Menu exhibiting all graph types for selection
- Graphs can be resized, and rotated 360 degrees or on any axis for best viewing angle
- 180 choices of shades and patterns for various graph elements
- Automatically converts data from one 2-D chart to another, or from 2-D to 3-D; all graph types compatible.

Note: the six remarkable 3-D graphs you see on these two pages were drawn using Perspective. Which should give you greater perspective on Enable 2.0's vast potential.



## 100+ new features and enhancements to enhance your productivity.

Not bells and whistles, but meaningful improvements! Across all modules. Brought about by listening to our special User Advisory Board, calls and letters to our Customer Support staff and continuing dialogue with such demanding Enable users as the U.S. Air Force, AT&T and Hughes Aircraft.

Here are some 2.0 enhancement highlights:

- A High-Level Language Interface [Basic, C, Pascal]
- Expanded macro facility
- Enhanced report language
- Enhanced menu generator
- Simplified installation/getting started procedure.
- 80,000 word Proximity/Merriam-Webster Linguibase™ spelling checker
- Row/column sorting on spreadsheets
- Simultaneous display and updating of spreadsheet and graph
- Enlarged Import/Export file compatibility with a wide range of popular software*

And remember, these are improvements to what is already recognized as the most fully featured, most powerful, most customizable, tightly integrated software system in existence.

## More and more users are using more and more of Enable.

In the tough, spec-filled world of the Federal Government, Enable is by far the number one selling integrated software.

In the corporate world, after thorough testing and trial usage, dozens upon dozens of Fortune 1000 companies have specified Enable.

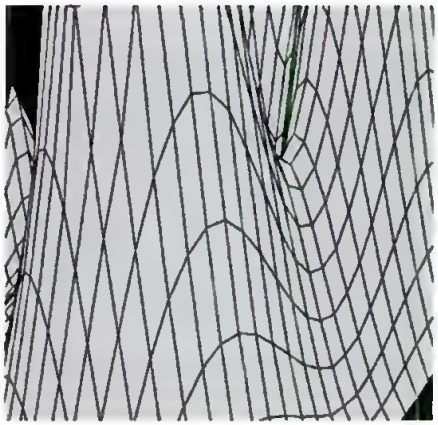
And thousands of smaller companies have come to the same conclusion: Enable has an incredible ability to handle a nearly unlimited range of jobs.

- From the Dow Corning Economic Evaluator, "It's not really a matter of finding ways to use Enable. I haven't found a way not to use Enable."
- From a DP Manager for Postal Service HQ, "When people come in for a spreadsheet, we give 'em Enable. Database... we give 'em Enable. Word processing... we give 'em Enable. I simply can't see us outgrowing Enable."
- From Xerox, after benchmarking the three leading integrated systems, "[Enable had] the user-friendliness and methodology of integration we were looking for."

As a complete off the shelf product or as a base product on which to build special applications, there just isn't a package on the market that can touch Enable. Especially now that 2.0 is here.

*Compatible with WordStar, MultiMate, EasyWriter, VolksWriter, PeachText, DCA, DIF, ASCII, 1-2-3, VisiCalc, SuperCalc 3, SYLK, dBASE, Condor 3, PC File III

# IN A NEW PERSPECTIVE



## One after another, the raves keep flowing in.

Raves! Raves! Raves! Reviewers were lauding Enable even before 2.0.

"A masterpiece of engineering... Enable clearly outdistances its competitors. It is, without a doubt, the first of a new generation of integrated software products."

*(PC Products)*

"The great thing about Enable is that it gives you all the benefits of a collection of top-notch stand-alone packages—plus integration to boot. It's what Symphony was supposed to be."

*(Software News)*

"If you are looking for one program to do it all, this is the one."

*(PC Magazine)*

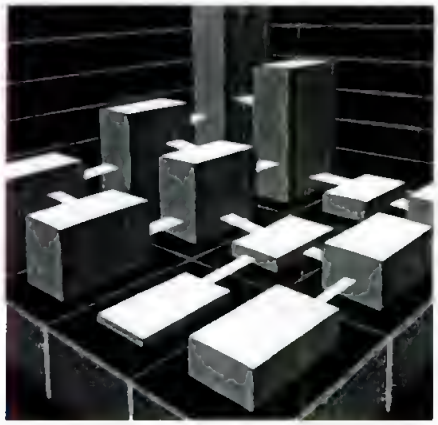
"Enable... may be the first program to make you give up your dog-eared WordStar, dBASE, Smartcom and Lotus 1-2-3 disks."

*(Business Software)*

"Each of the five modules... has a depth of features and functionality rare in an integrated package..."

*(InfoWorld)*

Enable 2.0 is bound to generate a whole new file of raves! Including your own.



## Enable/LAN. A great new way to make connections.

Enable/LAN gives you the most useful, powerful PC network software on the market.

Consider, a system with all the benefits of Enable 2.0 itself:

- System design, documentation and support making ease of use a reality.
- Word processing, spreadsheet, graphics, DBMS and communications equal to the functionality of the best stand-alones.
- Smooth, simple, fast integration between applications.

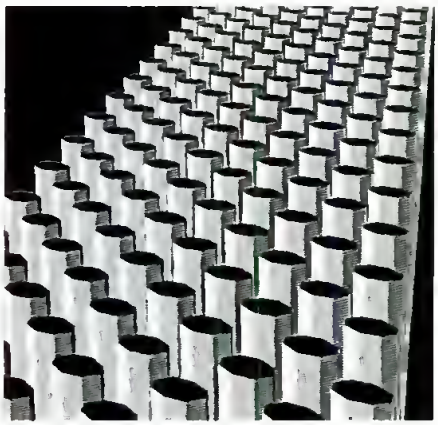
With all the LAN features you'd expect:

- Password protection for all applications.
- File and record locking for all applications.
- Compatibility with all the major networking software.

Plus some unexpected benefits. Just one example: Enable/LAN is import/export compatible with the most popular PC software, meaning you can share files on your network from packages that don't currently offer LAN versions, such as 1-2-3.

To find out more about all you can do with Enable/LAN, land on your favorite dealer's doorstep.

(Available 2nd quarter, 1987)



## Count the ways we'll help you get the most from your investment.

- Extensive training programs, on-site or at our headquarters, Beginner through Advanced, at very reasonable rates
- Custom consulting service for the creation of special applications
- Availability of Enable/Learn—a comprehensive training program—complete with instructor's manual and student workbooks
- Site licensing program
- A Customer Support Plan which provides, at a nominal charge:
  - —Toll free technical support
  - —Technical newsletter
  - —Discounts on Enable upgrades
  - —Opportunity to participate in User Advisory Board and in Beta-testing

If you now have a new perspective on Enable, we'll help you find a dealer who can enlarge that perspective even further. Just dial 1-800-634-3470 (in New York, 1-800-SS1-1004.)

**enable**

*integration without compromise*

© 1987 The Software Group,
Northway Ten Executive Park,
Ballston Lake, New York 12019

CIRCLE 353 ON READER SERVICE CARD

"Serving the Nation's Capitol and the World"

ITS

ITS TEK-NET-BBS (703) 690-7462

Visa, MC, CHOICE, AE
Leasing, Renting & Financing available

**Open 7 days a week**

**(703) 847-4740 (800) 642-2395**

**Information and Technology Services, Inc.**

Micro Systems Specialists

8478 Tyco Rd., Vienna, VA 22180

### Drives

| | |
|---|---|
| 20 MB SEAGATE 65MS | $379 |
| 30 MB SEAGATE RLL | $479 |
| 20 MB ST4026 AT | $573 |
| 30 MB ST4038 AT | $651 |
| 40 MB ST4051 AT | $792 |
| 80 MB ST4096 AT | $1273 |
| 40 MB PRIAM XT | $1395 |
| 60 MB PRIAM XT | $1450 |
| 40 MB PRIAM AT | $1175 |
| 60 MB PRIAM AT | $1350 |
| BERNOULLI DUAL 10 | $1839 |
| BERNOULLI DUAL 20 | $2494 |
| 20MB PLUS HARDCARD | $695 |
| 20MB MAYNARD HCARD | $759 |
| ISI WORM 220MB INT. | $2995 |
| 60MB ARCHIVE TAPE | $740 |
| 60MB ARCH. EXT. TAPE | $740 |
| 60MB GENOA TAPE | $935 |
| 60MB SYSGEN | $1089 |
| TOSHIBA 3.5 DRIVE | $150 |
| *TOSHIBA 5.25 EXT. | $349 |
| FUJITSU 360 K DRIVE | $89 |

### Laser Printers

| | |
|---|---|
| CANON A1 | $2095 |
| CANON A2 | $3085 |
| HP LASERJET | $2295 |
| QMS KISS | $1995 |
| XEROX 4045 | $CALL |

### Printers

| | |
|---|---|
| NEC P-6 | $465 |
| NEC P-7 | $670 |
| NEC P-5 | $1107 |
| NEC P-5XL | $1230 |
| PANASONIC 1080 I | $220 |
| PANASONIC 1091 I | $284 |
| PANASONIC 1092 | $345 |
| PANASONIC 1592 | $465 |
| STAR LV 1210 | $174 |
| STAR NX-15 | $368 |
| STAR ND-15 | $430 |
| STAR NR-15 | $522 |
| STAR NB 24-15 | $684 |
| STAR 5D-10 | $340 |
| STAR NX-10 | $240 |
| BROTHER 1509 | $425 |
| CITIZEN MSP-10 | $305 |
| CITIZEN MSP-15 | $420 |
| CITIZEN PREMIER 35 | $470 |
| TOSHIBA P341 | $820 |
| TOSHIBA P351 | $1212 |
| FUJITSU DLP24 | $1224 |
| FUJITSU DM91 | $398 |
| OKIDATA M182 | $264 |
| OKIDATA M192+ | $397 |
| OKIDATA M193+ | $598 |
| OKIDATA M84 | $698 |
| OKIDATA 2410 | $1961 |
| EPSON FX-286 | $609 |
| EPSON LX-80 | $270 |
| EPSON FX-85 | $419 |
| EPSON LQ-800 | $616 |

$

### Memory Boards

| | |
|---|---|
| JRAM 2 | $129 |
| JRAM 3 ABOVEBOARD | $179 |
| JRAM AT | $179 |
| JRAM AT3 ABOVEBOARD | $239 |
| JLASER MODULE | $265 |
| JLASER + | AVAIL. |
| INTEL ABOVEBOARD | $438 |
| AST RAMPAGE 512K | $485 |
| ORCHID CRAMRAM | $291 |
| 576 K MEMORY BOARD | $68 |
| AST 6 PAK + W/384 | $210 |
| QUADBOARD W/384 | $199 |

### Chips

| | |
|---|---|
| 64K 150ns set of 9 | $8 |
| 64K 120ns set of 9 | $9 |
| 256K/150ns set of 9 | $23 |
| 256K/120ns set of 9 | $25 |
| 64 × 4 | $4 |
| 128K Piggyback | $5 |
| 8087-3 | $119 |
| 8087-8 | $169 |
| 80287 6MHz | $192 |
| 80287 8MHz | $306 |

### Monitors

| | |
|---|---|
| NEC MULTISYNC | $595 |
| SONY MULTISCAN | CALL |
| AMDEK 722 | $549 |
| AMDEK 310A | $150 |

### Software

| | |
|---|---|
| SUPERCALC 4 | $335 |
| SUPERPROJECT + | $295 |
| WORDPERFECT 4.2 | $250 |
| WORDPERFECT 4.1/3.5 | $250 |
| DBASE 3+ | $430 |
| FOXBASE + | $335 |
| FRAMEWORK II | $399 |
| RBASE 5000 | $320 |
| RBASE 5YSTEM V | $396 |
| CROSSTALK XVI | $99 |
| REFLEX | $96 |
| TURBO PASCAL W/BCD | $69 |
| TURBO PROLOG | $60 |
| TURBO LIGHTNING | $61 |
| NORTON UTILITIES | $57 |
| MS WINDOWS | $69 |
| MS QUICKBASIC | $65 |
| MS C-COMPILER | $298 |
| MS WORD | $280 |
| WORDSTAR 2000 MULTIMATE | $270 |

*"Editor's Choice"*

PC MAGAZINE
OCT. 14, 1986

The ITS Turbo XT from Information and Technology Services is our "best buy" recommendation

**$849.00** complete

with 20MB and 1 floppy **$1157**

**ITS Turbo XT**

1 year warranty
30 day money back guarantee

IBM® PC Compatible

**ITS TURBO 286 AT**

**$1095.00**

- Phoenix ROM BIOS
- Full one year warranty
- 80286 CPU switch selectable 6 or 8 Mhz (10 Mhz optional)
- 1.2 MB Floppy Disk Drive
- Supports up to 5 internal ½ HT drives
- 2 serial/1 parallel ports built into chassis
- real time clock • 8 expansion slots

and many more features

- 6/10 Mhz optional $1195

## PRICING SENSATIONS!

| | |
|---|---|
| 20 MB SEAGATE DRIVE | $379 |
| 30 MB SEAGATE DRIVE | $479 |
| SAMSUNG AMBER MONITOR | $79 |
| NEW ENHANCED KEYBOARD | $79 |
| MONO GRAPHICS CARD | $69 |

## OTHER SYSTEMS

| | |
|---|---|
| BIOS AT 8Mhz | $1769 |
| SPERRY MICRO IT | $1795 |
| IBM XT | $1195 |
| IBM AT | $2395 |
| 1800+ AT (EVEREX) | $1195 |

SPERRY

**PC/IT**

Superior to the IBM AT
Rated 8.8 by InfoWorld

44MB, 28ms Access Hard Drive
3 Speed Processor
Free 8 MHz Math Coprocessor
1.2MB Floppy, 512K Ram
2 Serial/1 Parallel Ports
Clock/Calendar
DOS 3.1 Basic, System Guide

**$2,695.00** 1 year warranty

(Monitor-Video Card-Keyboard: not included)

## LAPTOPS and ACCESSORIES

| | |
|---|---|
| Toshiba T1100 Plus, (new screen) | $1695 |
| Toshiba 3100 | $3195 |
| Sharp PC 7000A | CALL |
| Centronics GLP II Printer | $215 |
| Toshiba Ext. 525 Drive | $339 |
| Toshiba 1200 Modem | $329 |

NOVELL NETWORKING DESIGN & INSTALLATION

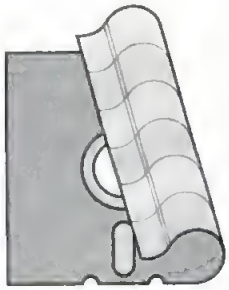
- Prices subject to change 2/23/87
- 10% re-stock fee on all items
- Software non-returnable if opened
- No surcharge on VISA, MC, CHOICE or AE

**PANASONIC BUSINESS PARTNER**

FX-600 2DS/DD, 256K
**$895**
with 1 DS/DD, 20 MB
**$1145**
(Monitor and Adapter extra)

■ JARED TAYLOR

# SPREADSHEET CLINIC



*Lotus's secrets about printer strings and model measurements; formulas only you can find; a quick-copy caution; and using Symphony's Macro Library for sequential printouts.*

## EMBEDDING SETUP STRINGS

Release 1A of *1-2-3* lets you use printer setup strings to change the printing characteristics of different spreadsheets. Release 2.0 goes farther in also letting you switch printer output within the same worksheet. You just precede the setup string with two vertical bars ( | | ) and embed it within the spreadsheet text. That, at any rate, is what the manual tells you, but things aren't quite so simple.

For *1-2-3* to recognize a printer string, the string must be in the first column of the print range. You can put more than one setup string on the same row, as long as all the strings are in the first column. *1-2-3* will ignore anything that is not in the first column of any row that contains a setup string. Finally, a row that contains a setup string will not produce a carriage return and line feed unless you specifically include the printer codes for them. That is to say, without the codes, any text in the row below the setup string is added to the text that immediately follows the string.

Note, too, that the first | sign you enter into a cell is not displayed. Thus, the vertical bar is a special kind of label prefix that, when placed in the first column of a print range, signals to *1-2-3* that what follows is a printer setup string. When plain text follows this character, *1-2-3* omits the entire line when it prints.

Figure 1 shows sample setup strings (for Epson printers) embedded in the text of a spreadsheet, and Figure 2 shows the printed results. There are many differences. Since \015 turns on compressed mode and \018 turns it off, the first sentence of text is compressed and the second is not. Both sentences, along with the setup strings, were entered into the first cell of the first row of the print range. The third sentence on the same line, "This will be ignored," is ignored because it is entered in a different cell, not in the first column of the print range.

```
                A                          B                          C
-----------------------------------------------------------------------
1  ||\015This should be compressed. \018This should not. This will be ignored.
2  This should be normal width.
3                  ||\015This setup string will be ignored.
4  |This whole line should be ignored.
5  Another line of text.
```

**Figure 1:** *Examples of printer setup strings used within the text of a 1-2-3, Release 2.0, spreadsheet.*

```
This should be compressed. This should not.This should be normal width.
                           |\015This setup string will be ignored.
Another line of text.
```

**Figure 2:** *Printed results of the display in Figure 1.*

Since the code for a line feed is not embedded in the same line of text, the second line of Figure 1 is printed on the first line in Figure 2, immediately after the first two sentences of Figure 1. The printer setup string in line 3 of Figure 1 is treated as text instead of a setup string because it is not in the first column. The fourth line of Figure 1 is completely ignored in printing because it begins with the vertical bar and is in the first column of the print range.

Jim Kueherer
Monroeville, Pennsylvania

*This is all true, and there's not a hint of it in the 1-2-3 manual. Lotus clearly designed embedded setup strings to be used on lines by themselves, in the first column of the print range. That way, they take up lines on your screen but might as well not exist at print time. By fiddling with them, you can put several on the same line, and by putting text between them, you can change printing characteristics more than once on the same line, as long as you do it within the same cell.*

*The next submission explores one of the uses of this undocumented label prefix, the vertical bar.*

## MEASURING FOR MEASURE

When you print a *1-2-3* worksheet, it's not always easy to tell how wide it's going to be and whether it will fit on the page. Figure 3 shows a ruler I have devised that shows how many characters wide your model is. The numbers in the ruler are entered into two single cells and can go up to the maximum number of characters *1-2-3* will accept, 240. When you need to know the width of a print range, copy these two cells to the left edge of the range and then

## ■ SPREADSHEET CLINIC

```
|RULER   10        20        30        40        50        60        70
|123456789|123456789|123456789|123456789|123456789|123456789|123456789|
```

**Figure 3:** *A spreadsheet-width ruler that will not appear in a printout.*

move the cursor to the right edge. The number on the ruler will tell you how many columns wide the printout will be. If you use the | symbol at the left end of the ruler cells and put the ruler at the left edge of the print range, the ruler will not be printed along with the worksheet.

Since it's a chore to enter the numbers that make up the ruler, I keep a file called RULER.WK1 on my *1-2-3* disk that contains only the two lines of the ruler. I read it into a worksheet whenever I need it, with /File Combine Copy Entire-File.

William J. Sheppard
Columbus, Ohio

*This is a handy use for an undocumented quirk in* 1-2-3. *You can also use the | label prefix to include any other notes to yourself that are useful while you work on a spreadsheet, but that you don't need when you print.*

### PRINTING SEQUENTIAL FILES

How do you print several *Symphony*, Release 1.1, files continuously without having to supervise your computer the whole time? With the simple macro in Figure 4, which you save in the Macro Library.

First, though, use the {Services} File Table command to read into your worksheet the names of the files in your directory. Erase the ones you don't want to print, and leave the rest in a single column—column C in Figure 4. In cell D3, enter the single formula at the bottom of the figure and copy it down the column for as many rows as are in the file table. It is a string formula, which reflects the contents of the cells in column C, and it will appear in your worksheet as it does in the figure. Give the range name \P to the macro lines in column D.

Now, attach the Macro Manager application to *Symphony*, and save both columns of your macro. Set up your printer and hit Alt-P to begin.

Notice that the way the macro is set up, you can substitute any list of files for the one shown in column C. If you frequently print the same set of files, then you should use the Range Value command to change all the formulas in column D to values. Then you can save only the macro range, \P, without column C.

Myrna U. Gonzalez
Houston, Texas

*This is a simple, effective macro that would fall on its face in* 1-2-3. *As soon as it read in the first file to be printed, the file containing the macro would be gone, and \P would stop dead in its tracks. Handy things, those macro libraries.*

### QUICK COPYING

John Predmore's submission on cell copying in *1-2-3* (Spreadsheet Clinic, Volume 5 Number 17) can save you a lot of time. [*The tip involves copying a cell or range when the source and destination ranges are far apart in the spreadsheet. At the end of a normal Copy sequence, the cursor will be at the FROM range. If you want it to end up at the TO range instead, start the sequence at the TO range. After /C, hit Backspace to unanchor the FROM range. Now, page around and find the FROM range, then hit Enter twice. The copy operation will end with the cursor at the TO range.—Ed.*]

As Mr. Predmore suggests, copying is even easier if you have remembered to name a distant source range. Even if you haven't, it can be useful to go back and give it a range name if you find you need to copy it to more than one destination. I usually give the source range the name X. That way, all I have to do is move the cursor to each destination range and type

```
/cx <Enter> <Enter>.
```

A word of warning, however: If you finish with one source cell and need to copy from another, be sure to /Range Name Delete the range X you used on the first cell before you assign it to another cell. If you don't, and if another cell in the worksheet refers to that cell in its own formula, the formula will magically refer to the *new* cell with the name X. This makes a mess of your spreadsheet and can be very hard to correct.

John Ford
Richmond, Virginia

*Mr. Ford's submission is as valuable for its final warning as it is for the copying tip. Although we have covered this ground before in Spreadsheet Clinic, it bears repeating that if you simply reassign a range name without first deleting it, any formula that referred to the cell that first had that name now refers to the cell that just got it. By the time you notice the resulting calculation error, you will probably have forgotten which cells ever had the same range names. And since there's nothing obviously wrong with the now incorrect formula, you've got yourself a bug that not even the best spreadsheet analysis tool can find.*

### HIDING FORMULAS

In the Volume 5 Number 10 Spreadsheet Clinic, several methods for hiding the contents of cells in *1-2-3* are presented. While Release 2 has a new format for hiding cells, Release 1A has a very effective, un-

```
          C                          D                  E
-------------------------------------------------------------
 3  FIRST.WRK        {services}frFIRST.WRK~{services}pagpq
 4  SECOND.WRK       {services}frSECOND.WRK~{services}pagpq
 5  THIRD.WRK        {services}frTHIRD.WRK~{services}pagpq
 6  FOURTH.WRK       {services}frFOURTH.WRK~{services}pagpq
 7

    Formula in cell D3, copied to cells D4..D6:

    +"{services}fr"&C3&"~{services}pagpq"
```

**Figure 4:** *A* Symphony *macro that prints worksheets in sequence.*

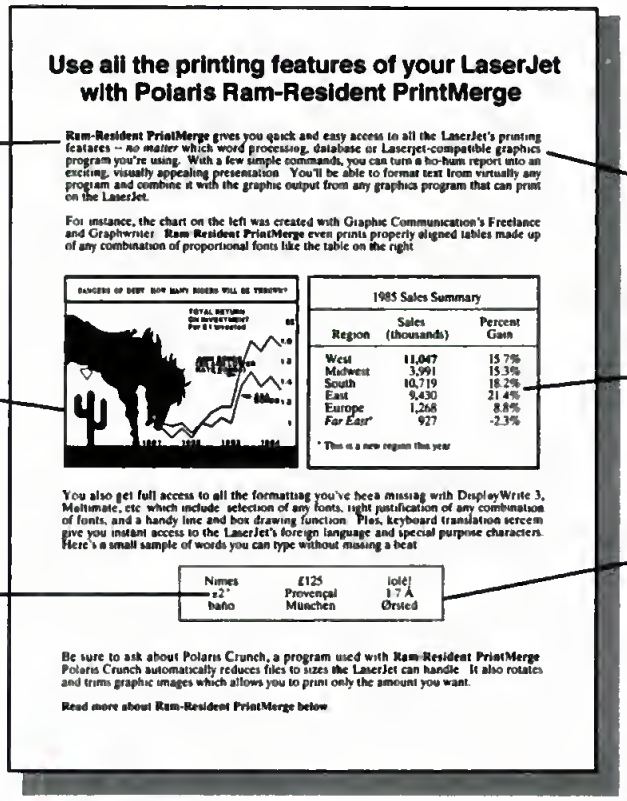
**JUST RELEASED VERSION 2.0**

# Unleash the power of your LaserJet™

**Mix any combination of fonts**

**Merge text and graphics from any program**

**Print extended and foreign language characters**




**Justify any proportionally spaced text**

**Align tables printed with proportional fonts**

**Draw lines and boxes**

Your software only lets you use a small fraction of the LaserJet's printing capabilities. Unfortunately, that also limits how precisely you communicate your message. That's why you need Polaris Ram-Resident PrintMerge.

It's the only program that puts you in direct control of all the LaserJet's printing capabilities—so you control what your document looks like, not the limitations of your software.

You'll be able to add graphics right in the middle of your text. Use all the LaserJet fonts and extended characters wherever you like. And print it all beautifully with Ram-Resident PrintMerge's justification and line-drawing abilities. What's more, Ram-Resident PrintMerge works with the software you're already using, so it's very easy to learn.

Since Ram-Resident PrintMerge lets you merge graphics from virtually any program that prints on the LaserJet, you can reinforce complex ideas with illustrations right in the text. You can merge the graphic output or save a screen image, and merge either in any of four print resolutions. If your graphics are too large for your LaserJet to handle, try Polaris Crunch, a separate program that compresses, rotates and trims images.

Recommended by HEWLETT PACKARD

With the help of Ram-Resident PrintMerge's useful formatting features, your document will be as impressive as its contents. You'll be able to use LaserJet fonts in any combination for more attractive, readable text. And justify right-hand margins and align table columns printed with proportional fonts—even if they're downloaded from diskettes. For extra emphasis, use Ram-Resident PrintMerge's line and box drawing capabilities and the LaserJet PLUS patterns to highlight important ideas.

And when you need to use extended or foreign language characters, Ram-Resident PrintMerge's five keyboard translation screens will put them at your fingertips instantly.

But even with all these features, Ram-Resident PrintMerge is truly easy to use.

## Runs Directly From:

| | |
|---|---|
| DisplayWrite 3 | WordStar |
| Multimate | Microsoft Word |
| Freelance | Graphwriter |
| Lotus 123 | Javelin |
| Paradox | WordStar 2000 |
| NewWord | Framework |
| R:base 5000 | Easy |
| Map-Master | Microsoft Chart |
| WordPerfect | PC Crayon |
| Chart-Master | Sign-Master |

**and more**

Timesaving printer setup screens store nine sets of page parameters. Simply enter parameters for Lotus, dBase, or any other application program once, and use them again and again. "Ram-Resident" means it loads automatically when you boot your system, so it's always ready. Just use your software as you normally would. When you need Ram-Resident PrintMerge's special features, set up the printer with one of the nine setup screens or key in the simple print commands right in your document.

Put the rest of your LaserJet's printing power to work for you. Call these toll-free numbers to order your Ram-Resident PrintMerge. Versions are available for IBM-PC/100% compatibles. There's a 30-day money-back guarantee, so order now without risk.

# $149.

**For ordering information call:**

**Inside California call**
**1 (800) 231-3531**

**Outside California call**
**1 (800) 338-5943**

POLARIS SOFTWARE
613 W. Valley Parkway
Suite 323
Escondido, CA 92025
(619) 743-7800

CIRCLE 379 ON READER SERVICE CARD

## ■ SPREADSHEET CLINIC

documented technique for hiding formulas. All you have to do is set the column width to 1 and reformat the formula as text with /Range Format Text. The formula will now disappear. Moreover, you can completely write over the hidden formula by entering a long label in the cell located to its left. If the inserted label is long enough, it will spill right through the column with the hidden formula and on into any blank columns further to the right.

There are several ways to view the results of this invisible formula. The quickest method is to put the cursor on the cell, hit F2 (Edit), and then hit F9 (Calc). The results of the calculation will appear in the control panel. Another method is to enter its cell address, as a formula, in another cell. Thus, if you had hidden a formula in cell B3, you could display the results by entering +B3 in another cell.

This hiding technique works only with formulas, not with single numbers. Even if you format a single number as text, it will be displayed as an asterisk in a column that is one character wide. This is *1-2-3*'s standard way of telling you that a column is too narrow to display a number. It's easy enough, though, to turn any number into a formula: just add a zero! A text-formatted entry of 34 will display as an asterisk, while 34+0 will be invisible. The results of formulas that refer to that cell will, of course, be unchanged.

Richard Aitkins
Renton, Washington

*I didn't think there were any more big surprises left in good old Release 1A, but I see I was wrong. I didn't believe this would work, but it does. This trick is very effective, because not only are formulas invisible, they can be completely written over with text. You could have an entire spreadsheet compressed into columns one character wide and hide the whole thing behind an innocuous memo. If you cursor over to the hidden cells you will see their contents in the control panel, but no one would think of doing that.*

*The same hiding technique will work with Release 2, but long labels will not lap over into cells with hidden formulas, so you can't cover them over with text.*

### CONTRIBUTE TO THE CLINIC

Share your latest spreadsheet discovery through *PC Magazine*'s Spreadsheet Clinic. We'll pay you $50 for anything we print, *plus an extra $25 if you submit it on a disk*. If you send a disk, please include a printout of your submission.

Mail your contributions to Spreadsheet Clinic, *PC Magazine*, One Park Avenue, New York, NY 10016. Please do not use MCI Mail, however.

COMMUNICATIONS SOFTWARE FOR dBASE

We didn't mean to change the world.

When we developed a software package for PC database communications, we really didn't mean to reshape the PC world. We did, though. Because we ended up creating a powerful communications tool. One that actually changes the way PC's *communicate with remote databases, services, terminals and devices.* We call it dCOMM▸LINK. It allows direct database to database communication and file transfers. It eliminates manual data entry. And that makes it completely innovative. But the applications are what will startle you. Our customers, computer consultants and VAR's have demonstrated that its uses are, practically speaking, unlimited. Its connectivity is superb. And we made it configurable, so dCOMM▸LINK works in almost any communication environment, with virtually any protocol, line speed, handshaking or password. There's a lot more, too. It's fast, efficient and flexible. And it's proving itself over and over again. Ask your MIS manager or computer consultant. And keep in mind we offer incentives to VAR's.

You can order from your authorized dealer or direct. So, call us—we can ship immediately. dCOMM▸LINK. An innovation that's setting the standard for PC communications.

dCOMM▸LINK

▸SUPPORTS:
- Clipper,™ dBase III Plus,® FoxBase,™ Quicksilver™
- 100% IBM® compatible
- 512K minimum
- EBCDIC and ASCII
- File Transfer/Receive with ASCII file transfer or Xmodem
- Smart modems (Originate/Answer)
- COMM1: and COMM2:
- Speeds 110-9600

▸FEATURES:
- High speed screen scrolling
- Communications macro language
- ASCII and HEX data scape

▸PRICE: $295.00

To order call: 800/628-2828, ext 695. Information: 213/306-8592

FASTCOMM SOFTWARE
Published by FES Products

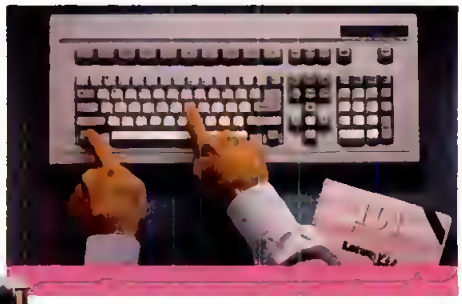
Registered trademarks: IBM PC: International Business Machines Corp./Clipper: Nantucket Corp./dBase III Plus: Ashton-Tate Inc./FoxBase: Fox Software/Quicksilver: licensed to WordTech Systems Inc. by Quicksilver Software Inc.

CIRCLE 148 ON READER SERVICE CARD

# 101 MACROS *for* LOTUS® 1-2-3® and 101 MACROS *for* SYMPHONY®

## Instead of This . . .

## You Can Do This . . .



### MAKE LOTUS EASIER — *AND* MORE POWERFUL

Now you can have your own on-disk library of shortcuts, utilities and keystroke savers that will work with *ANY* Symphony or 1-2-3 worksheet (all versions). No more dull, repetitive operations, no more wading through multiple menu steps, no more hours wasted with manual input that could be automated.

Introducing the ultimate collection of 101 pre-typed, ready-to-use, all purpose macros on disk. Imagine being able to:

- Add word processing features to Lotus 1-2-3, including word-wrap
- Double-space your 1-2-3 printout, or print in super-tiny elite type
- Create special graphics and slideshow presentations
- Add a pop-up notepad, calculator and appointment calendar to your files
- Address form letters and print labels automatically
- Add menu-driven financial formulas and math functions

— Plus 95 more features to save time and multiply the power of Lotus 1-2-3.

### INCREASE YOUR EFFICIENCY WITH 101 MACROS FOR LOTUS 1-2-3

You can save keystrokes, save menu steps, save time and automate your spreadsheet. Speed data entry with any one of three special Data Entry macros. Whip through complicated menus with a single keystroke, or set up your own custom menus. Eliminate repetitive operations with macros that will move down columns or across rows, changing each cell to your specifications.

## With This. $69.95

### AND NOW INTRODUCING 101 MACROS FOR SYMPHONY

— All of the most popular macros from 101 MACROS FOR LOTUS 1-2-3, plus:

- Macros to automate the building of custom-made forms
- Gantt-like project management scheduling
- Automatic bold and italic type, page breaks and margins in Symphony's sheet mode
- Insertion of subtotal lines and instant subtotal calculations
- Recalculation of the spreadsheet by range

### EASY TO USE

These macros are extremely easy to transfer to your own spreadsheet—and our User's Manual has made it even easier. Just a few keystrokes using File Combine is all it takes to transfer any of the macros from our handy on-disk collection to your own spreadsheets. And for the Symphony users, putting the macros in your Macro Library will make them even handier.

### FREE! EXTRA BONUS FILES

Act now. For a limited time you get not only a complete collection of 101 macros with User's Manual, you will also receive an extra collection of 22 macros designed to help you type your own macros, a blank memo template with word-wrap and fancy printout, and a collection of Often Overlooked Tips for Lotus Users.

*"A simplified way to access 123's and Symphony's most powerful functions."*
*—PC Week, 10/86*

*"A 123-taming arsenal . . . become a macro maven instantly"*
*—PC Magazine, 12/86*

*"One of the best ways to learn more about 123 and macros that I have seen."*
*—Computer Currents, 8/86*

*"Excellent. . . more than just a convenience tool. . . an enhancement for Lotus 123."*
*—Microtimes, 3/86*

### NOT COPY PROTECTED
### 60-DAY MONEY BACK GUARANTEE

*Lotus 1-2-3 and Symphony are registered trademarks of the Lotus Development Corp.

### 101 MACROS

YES! I want 101 shortcuts, utilities and keystroke savers!

___ copies of 101 Macros for Lotus 1-2-3 @ $69.95.
___ copies of 101 Macros for Symphony @ $69.95.
___ Shipping ($2.50 in USA, $12.50 outside USA)
___ CA residents add $4.90 tax for each product.

I enclose _____

—or— charge my ☐ VISA or ☐ MasterCard

Credit Card Exp. Date _____ / _____

Card # |_|_|_|_|–|_|_|_|_|
|_|_|_|_|–|_|_|_|_|

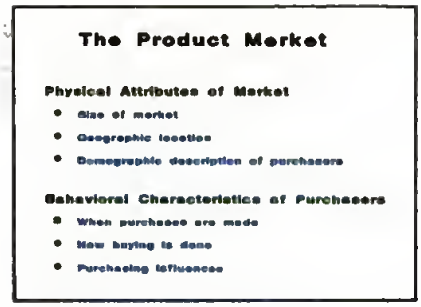
☐ IBM-PC or compatible ☐ DEC ☐ HP150

Name _____
Phone _____
Company _____
Address _____
City _____ State ____ ZIP _____

**MACROPAC**
INTERNATIONAL
19855 Stevens Creek Blvd., Suite 168 • Cupertino, CA 95014

**1-800-624-0077**
**(In CA Call) 1-800-832-7766**

CIRCLE 374 ON READER SERVICE CARD




*Sign-Master by Decision Resources*

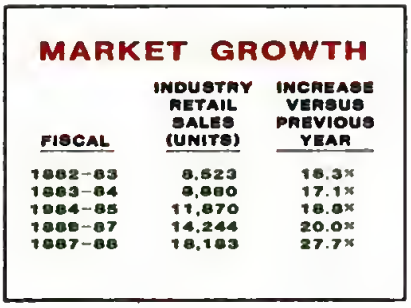
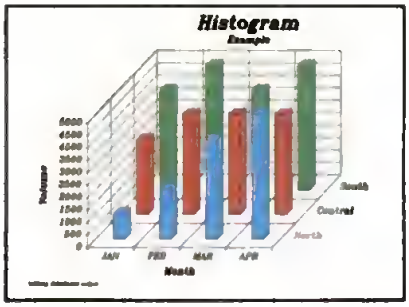
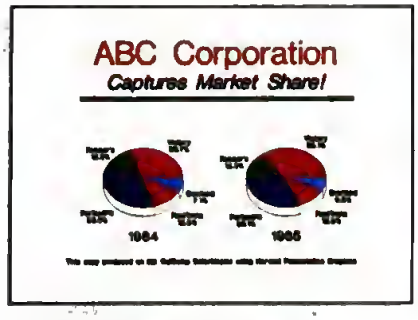


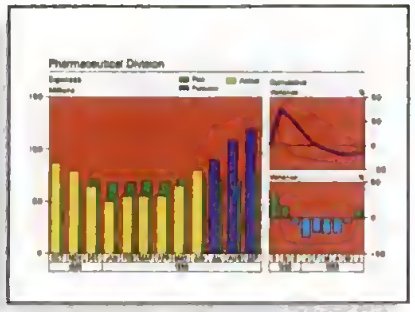

*Diagram-Master by Decision Resources*



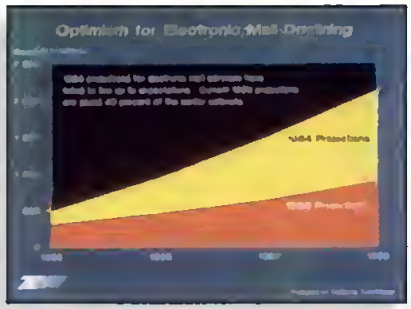

*The Smart Series by Innovative Software*




*Harvard Presentation Graphics by Software Publishing*




*LINK-A-GRAPH by ISSCO*




*Mirage by Zenographics*

# PUT COLOR IN YOUR HANDS, FAST.

ColorMaster® plotter/printer and your PC. That's all it takes to put living color into your presentation. Reports, memos, renderings, even transparencies projected on the screen. All in fantastic full-color. Fast.

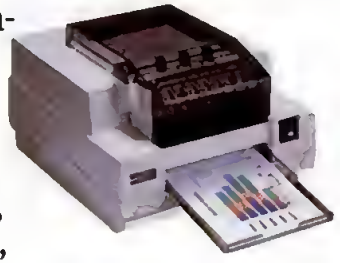
You can get a whole page of highly color-saturated graphics printed out in a minute. Or only 20 seconds for a page of printed black and white text.

ColorMaster's speed comes from advanced thermal transfer printing technology. So, quickly and quietly, the ColorMaster plotter/printer can produce high resolution color graphics up to 20 times faster than a pen plotter.

ColorMaster is ready to run with most popular graphics packages you might already be using, like Lotus® 1-2-3,® Chart-Master,™ Dr. Halo™ and more.*

It also has a fully-buffered PC interface which lets you go on working while ColorMaster is printing. What's more, multiple copies can be made without retransmitting data.

Software compatibility. Richly colored graphics. High-speed text. Along with worldwide support, service, and 25 years experience in computer graphics. With CalComp, you get it all.



Call us at 1-800-CALCOMP, or write CalComp, P.O. Box 3250, Anaheim, CA 92803.

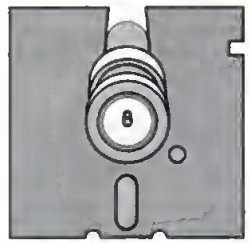
CalComp
A Lockheed Company

*Some of these software packages include: The Master Series ™ from Decision Resources; IBM® Professional Graphics; ™ ISSCO ™ PC LINK-A-GRAPH;™ Smart Series ™ from Innovative Software, ™ Lotus 1-2-3,® Symphony;® Dr. Halo ™ from Media Cybernetics, SPSS/PC+ Graphics ™ from SPSS Inc; Harvard ™ Presentation Graphics from Software Publishing; ™ Mirage,™ Autumn,™ Ego ™ from Zenographics. © 1986 CALCOMP.

CIRCLE 153 ON READER SERVICE CARD

■ FRANK J. DERFLER, JR.

# CONNECTIVITY CLINIC



*TCP/IP for those not in the know; clone servers with fast delivery; building bridges between networks; LAN tests; and security for the Fortune 500.*

### DEFINITION, PLEASE

What in the world is TCP/IP? Novell and other companies with LAN products are advertising that they now have TCP/IP compatibility. What is it and what does it buy for me?

*The TCP/IP protocols are two well-established systems for transmitting data that are finding new life in multivendor networks. The Department of Defense developed the Transmission Control Protocol (TCP) and the Internet Protocol (IP) for the Advanced Research Projects Agency (ARPA) network in the 1960s and carried them over to the present Defense Data Network. The ARPA network spawned the Tymnet and Telenet public packet-switched networks. Recently, several vendors adopted TCP/IP for use in local and wide area networks linking machines from different manufacturers.*

*TCP is mainly used to establish communications between stations on a network. It defines the kinds of messages they send and how they acknowledge messages. IP sets standards on how packets are made up, moved, and addressed. If these protocols are available on all computers (regardless of operating system or processor) on a network, they can exchange useful data messages in a standard fashion.*

### TURBOS AND COMPATIBLES

What advice can you give us about the use of high-speed AT alternatives and non-IBM clones as network servers? How about the new machines using the 80386 processor? Do they make good servers?

*First, remember that the slowest part of a server is not the processor. Even an 8088 processor running at 4.77 MHz spends most of its time waiting for the hard disk and other I/O. Money spent on a good hard disk or on RAM to be used for a disk cache and for buffers can yield better performance than money spent only on a turbo board processor. However, since the questions about faster machines continue to come in, here is the hard data we have collected so far:*

*Compaq's Deskpro 386 is fully compatible with Novell's* NetWare/286 *and, according to our source, "sits on its hind legs and howls." (We are assured this is good.) On the other hand, IBM's* PC Local Area Network Program *won't run on any machine whose CPU runs faster than 8 MHz. We had installation problems with* PC LAN *on IBM's own 8-MHz PC AT.*

*Don't frustrate yourself trying to use IBM Token-Ring Network cards in machines with no wait states like the IBM PC-XT 286 or ITT XTRA-XL. The IBM Token-Ring cards won't work without one wait state. You can insert a wait state in the ITT machine from the keyboard, and then it works fine. Otherwise you'll have to wait for the faster IBM boards.*

*Novell reports problems with ARCnet boards in several brands of "no-name" XT clones. It found individual network adapter cards that failed to work properly in a PC's Limited 286-12 and a Data Bank 10-MHz AT. Switching to a different card solved the problem.*

*3Com's TokenLink Plus and EtherLink Plus cards carry their own 80186 processors and can use the AT's 16-bit-wide bus. Set both the cards and the software for the faster interrupts and they should sing along with any high-speed AT compatible.*

■ The TCP/IP protocols are two well-established systems for transmitting data that are finding new life in multivendor networks.

### BRIDGING PC LAN AND NETWARE

We want to bridge two LANs that have grown independently. Is there a way for a network using IBM's Token-Ring Network software (*PC Local Area Network Program*) to communicate with an *Advanced NetWare*, Version 2.0a, system on 3Com's EtherLink cards?

*When you say "communicate," we assume you mean doing more than transferring files through a dial-in modem connection. The networks you described can, with the right software, do that.*

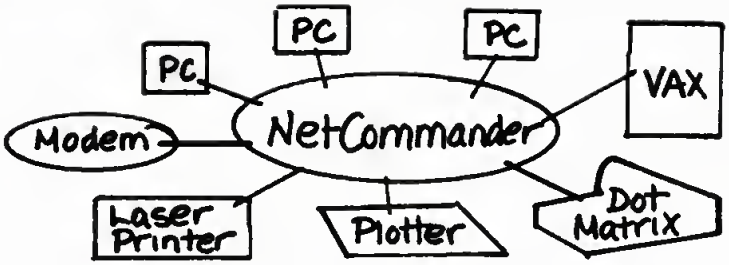
*It is not possible for IBM's* PC LAN *to invisibly communicate with* Advanced NetWare *through a network bridge.* PC LAN *and* NetWare *are two very different*

## ■ CONNECTIVITY CLINIC

*operating systems that, although they have many things in common, such as full DOS 3.1 support, have fundamental differences in architecture and operation.*

*If you want to bridge these networks, the easiest method is to replace IBM's* PC LAN *on the IBM Token-Ring Network cards with* Advanced NetWare, *Version 2.0a.* NetWare *is much faster and has more features, including some diagnostics, better security, and electronic mail.* Advanced NetWare *costs $2,195 as opposed to $125 for* PC LAN, *but that low price is deceptive. The add-ons for the IBM software will add up quickly.*


Printer Sharing
File Transfer




NetCommander sub-LAN is an affordable network solution. For 20% of the cost, you get 90% of the functionality of a full LAN.

- ☐ the ultimate in printer sharing to cost justify expensive printers
- ☐ error-free, peer-to-peer file transfer
- ☐ buffering, up to one megabyte and port contention/selection
- ☐ 4, 8, 16 and 30 port models

Digital Products Inc., 108 Water Street, Watertown, MA 02172
617-924-1680 Outside Massachusetts, Call 1-800-243-2333

NetCommander

1-800-243-2333

20% LAN Price
90% Performance

CIRCLE 280 ON READER SERVICE CARD


### INCREDIBLE!

I think the fact that you provide this service for free is incredible! How about some advice? We want to link four PCs to a 65-megabyte database and share a laser printer, dot matrix printer, and HP plotter. The longest connection between the PC AT server and a workstation is 200 feet and a false ceiling is available for the cable run. Security is important because this is the strategic planning division for a Fortune 500 company. We are looking for value in a system that can be maintained by end users. We may grow to six to seven workstations. What do you recommend?

Louis Walcer
Paoli, Pennsylvania

*Based on your need for security, good printer spooling, value, and easy maintenance and your lack of need for anything requiring NETBIOS, I recommend Fox Research's 10-NET. It has a great selection of user privileges and restrictions (to protect your data records), low cost, and a complete printer spooling system. I think strategic planners (I've been one) will like the on-line conferencing in 10-NET.*

*A hint: Take your time installing the 10-NET cables and make sure* every *wire in every tap box is positioned properly and every screw is tight. Hooking up 10-NET isn't any more difficult than installing a voice intercom, but if one wire is loose, nothing works. Buy Fox's cable diagnostic option. The 10-NET operating system software is not difficult to install and it is very easy to maintain.*

### PERFORMANCE TESTING

We are writing the specifications to use in a Request for Proposals for a local area network. We are considering using Innovative Software's LAN Performance Test to specify an acceptable minimum level of performance. Are these good benchmark tests? How would you recommend we use the test and state the performance level?

*LAN benchmark tests are like miracles and*

pcAmerican Marketing, Inc
17151 Newhope St. Suite 104 Fountain Valley, CA 92708

Call Toll Free:
1-800-654-5365
Tech Support (714) 557-3903
In CA Call (714) 557-3904

VISA
master charge

**Terms:** We accept cashier check, Money Orders, Visa, MasterCard, 3% extra on American Express, wire transfers, qualified P.O.'s and C.O.D.'s. All equipment carries a new factory warranty. Prices are subject to change. Any return item must be accompanied by a return authorization number and description. IBM, Compaq, Seagate, NEC, Toshiba, and Sony are registered trademarks of their respective companies.


# Product Blitzes

## Hardware

### Computers

**IBM**
*XT* 256K 1 DR *$1072
*AT* 256K 1 DR *$2475

**Multitech**
*1100* *********$3399
Intel 80386, 16MHz;
40 MB up to 2MB Ram
Accel 900 ****$1495

**IBM AT Comp. Computer**
The ***Accel 900*** comes with Intel 80286 chip operating at 10 MHz, eight expansion slots, Hard Disk Drive/Floppy Disk adapter, 512K RAM, expandable to 1MB, one 1.2 floppy, and MS DOS 3.2. The system works with Concurrent Dos, Xenix, and Unix. Hard disk drives additional floppies, and expansion cards available. It comes with x one year warranty from TRW to give you dedicated service and support at an economical price.

**Compaq**
*Deskpro 386*
40 MB, 16MHz *$4900
70 MB, 16MHz *$5700
130MB, 16MHz *$7475
The ultimate in performance for anyone who needs exceptional power and speed.

*Portable* 256K *$1644
*Portable II*
2DR 256K *****$2640
*Portable III*
*Model 20* ****$3850
640K 20MB
*Model 40* ****$4950
640K 40 MB
It features 12MHz, 80286. Two 5¼" 1.2 dr, 18 lbs., expandable to 6.6 MB. Full size 640 x 800 Display. Optional internal modem.

**PCAM**
8 MHz Turbo System
IBM XT Compatible Computer
20MB, 8MHz ****$895
30MB, 8MHz ****$955
Two floppies ****$555
The ***PCAM Computer*** can give you performance, expandability, compatibility, durability and versatility at an economical price. It comes with 640K, eight expansion slots, 150 watt power supply, the ERSO BIOS ROM and AT style keyboard. To insure you get the support you need PC American offers you a one year limited warranty and a 10 day Money Back Guarantee.

### Floppy Drives

**TEAC**
*55BV* 360K *****$99
*1.2 MB* *********$129

**Toshiba**
*ND040* 360K ****$99
3.5" 720K ******$129

**Fujitsu** *360K*** *$79

### LapTop Computer

**NEC**
***Multispeed*** ** $1539
***Multispeed*** is smaller, lighter and twice as fast as the other leading portable. Only 11.2 pounds, with a Super Twist LCD. What's more it has a separate numeric keypad so it is easier to use.

**Toshiba**
*T 1100+* ******$1555
Now has the Super Twist screen. The clock speed switches between 7.16/4.77 MHz, two 720K floppies, parallel, serial, and RGB ports.

*T 3100* *******$2990
One 720K Drive with 10MB Hard drive. Only 17 lbs., take it with you anywhere.

*External 5¼"* **$399

### Hard Disk Drives

**Seagate**
20MB *ST225* KIT $368
30MB *ST238* KIT $459
40MB *ST251* KIT $669
30MB *ST4038* **$569
40MB *ST4051* **$669
80MB *ST4096* *$1049
+ Software

### Tape Backup

**Archive**
*20 MB Internal* **$456
*60 MB Internal* **$695
*60 MB External* *$695

**Everex**
*Excel 20MB* INT *$629
*Excel 60MB* INT *$789
*Excel 60MB* EXT *$875
Automatic Back up. File by File retrieval, Mirror Image.

### Graphics Board Monochrome

**Hercules**
*Graphics +* *** $194
**Clone**
*Mono Graphics* $89

### Mono/Color Graphics Board

**Everex** *Edge* * $239

**STB**
*Chsuffer HT* **$199

### Monochrome Monitor

**Samsung**
*SM12SSA TTL* * $79

**Multitech**
*14"* Reversible, BK/W $149

**Princeton**
MAX *12* *******$154

**Amdek**
*310A* Amber TTL $149
*410W* 132 Col * $165
*1280* 1280 x 800 15" $778

### EGA Graphics Card

**Quadram**
*Prosync* ***** $329
(CGA, EGA, Auto Switch)

**NEC**
*GB-1* ******** $359
**Multisync Graphics.** 640x640 132 Col., Hercules/CGA/EGA 16 Colors

**Peradise**
*Auto EGA 480* $394

**STB**
*EGA* + CGA/EGA $299

**Video 7**
*Vega Deluxe* * $333
Auto switchable

**Tseng**
*EVA 480* ***** $379

### Color Monitor

**CTX**
*14"* RGB *******$269
640 x 200 (same as Multitech)

**Princeton**
*PL 14"* ********$478
770 x 400, 26 dot pitch

**Multitech**
*Color 14"* *****$329
640 x 200 + Switch

### EGA Monitor

**NEC** *Multisync* $559
Autoswitchable, 800 x 560. Wonderful display quality. Dot pitch .31

**Sony** *Multiscan* $599
Autoswitchable, 900x560, Dot Pitch .26

**Mitsubishi**
*Diamond Scan* $569

**JVC**
*GD-H3214* ****$569

**Thompson**
Ultra Scan **** 688
Monochrome, Hercules, CGA, PGC, 800 x 500 pixels, 45 to 75 Hertz.

### Plotter

**Hewlett Packard**
*7475A* ****** $1599
*7550* ******* $3329

**Houston Instruments**
*DMP 40* ****** $889
*DMP 42* ***** $2539
*DMP 52* ***** $3847

### Full Screen Monitor

**Micro Computer**
*Genius 402* * $1295
8½" x 11", 720x1008 Pixels

**Princeton**
*LM300* ****** $1049
Portrait Display, 8½" x 11", 1200 x 1664 pixels

**WYSE**
*700* ********** $769

### Printer Dot Matrix

**Diconix**
*150P* Ink Jet **** $339

**NEC** *24 WIRE*
*P9XL* ******* $1265
132 Col 400/330/140 CPS
*P7* ********** $651
136 Col /216/160/85 CPS Color
*P6* ********** $461
80 Col 216/160/65 CPS, Color

**Citizen**
*120D* ******** $190
80 col/120 CPS

**Toshiba** *24 WIRE*
*P321* ********* $434
80 col/216/72 CPS
*P341* ********* $699
132 col/216/72CPS
*351C* Model 2 $1224
132 col/300/100/132 CPS
*P351* **********$949
132 col/300/250/100CPS

**Panasonic**
*1080I* 120CPS **$217
*1091I* 160CPS **$281
*1592* 180/38CPS *$439
*1092I* 240CPS **$355

**Epson**
*FX 86E* ****** $429
*FX 286E* ***** $624
*EX 800* ****** $499
*EX 1000* ***** $699

### Printer—Laser

**Hewlett Packard**
*Laser Jet*
*Series II* *****$1990
Gives you 8 Pages per min.

**Toshiba**
*Page Laser II* $2797
12 Pages per minute. Six times the product life of Competition

**Kyocera**
*F1010* ******* $3191

**Tall Tree**
*J Laser+ PC* **$392
*J Laser+ AT* **$478

### Printer Buffer

**Quadram**
*Microfazer VI* $749
256K exp. to 1MB

### Memory Expansion

**Multifunction**
P/S/C/G/OK ***** $89

**AST**
*Sixpac*
*Premium* ***** $308
*Sixpac+* (384K) $227
*Rsmpags PC* * $234
256K + Deskview
*Rsmpags AT* **$445
512K + Deskview

**Everex**
*2 MB EMS* *** $129

### Scanner

**Princeton**
*LS-300* ****** $1046
Desktop Image Scanner with OCR Software. ***LS-300*** Allows you to go from paper to PC with text, graphics and photos.

### Modem

**US Robotics**
*Direct 2400 Int.* $179
*Courier HST*
*9600 Baud* ****$699
*Direct 1200 Int.* $109
*1200 External* **$116
*Courier 2400*
*External* ***** $369
**US Robotics** provides the most advanced data communications devices in the world. The modems are Auto Answer/Auto Dial and Hayes compatible.

**Migent**
*Pocket Modem* $106
Fits in shirt pocket

**Prometheus**
*Promodem 1200S* $321
*Promodem 2400S* $452
Security modems

### Input Devices

**Logic Mouse C7** $85

**Mouse Systems**
PCMouse ***** $126
Bus + PC Paint

**CH Products**
Mach III Joystick $35
Mach IV Joystick $40

### Power Supply

*150 Watt* ***** $79

**Data Shield**
*300 WT (XT)* * $349
*500 WT (AT)* * $549

### Software

### Business Software

Lotus *123* V 2.0 $305
RapidFile ***** $18
dBase III + *** $399
Dac Easy Accounting $45

### Word Processing

WordPerfect 4.2 $217
Word Star
Professional $251

### CAD/CAM

Prodesign II 2.5 $173

### Net Work Software

dBase III LAN *** $629
PFS Professional
Network *** $299
WordPerfect LAN $335

### Utilities

**Mece Utilities** $59
V. 4.0

### Investment

**Dow Jones, Market Analyzer Plus** * $267

***At last! - Fast, On-screen***

# FLOWCHARTS

Finally! An on-screen flowchart processor that knows about flowcharts - not just another "screen draw" program that makes you do most of the work.

***Interactive EasyFlow*** is a powerful full-screen graphics program dedicated to flowcharts and organization charts. With this program you can quickly compose charts on the screen. More important, you can easily modify charts so they are always up to date.

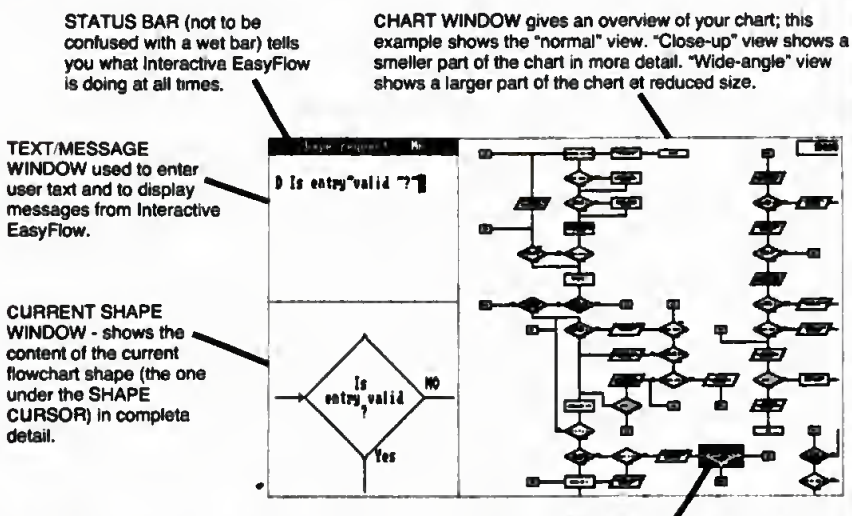
Features: • Text is automatically centered, character by character, within shapes as you type it • Text formatting controls allow you to over-ride the automatic formating where desired • Lines are created by specifying the starting and ending points - the program automatically generates the route • Cut and paste facility allows arbitrary chart fragments to be moved, copied rotated, reflected or sent to/from disk • Shape insert-delete and row/column insert-delete • Charts can be up to 417 characters wide by 225 lines high. Charts too wide for the printer are automatically printed in strips. • Charts can be larger than the screen - the window into the chart scrolls both horizontally and vertically as necessary • Works with many popular matrix printers including Epson, IBM graphics printer and compatibles. Full support for HP LaserJet and LaserJet Plus. Works with HP 7475A (& compatible) plotters. Can be used with ANY printer when non-graphic (character) output is acceptable • All standard flowcharting shapes included • Most shapes supplied in large, medium and small sizes • Extensive manual (100+ pages) includes many examples • Context sensitive "help" facility provides immediate assistance at any time • Any number of titles can be placed on a chart • Commentary text blocks can be placed anywhere in the chart • Fast: written in assembly language • Plus many more features than we can mention here

Requires at least 320K memory, DOS-2 or higher and an IBM or Hercules compatible graphics card. On EGA, full 640x350 resolution is used.

Order direct for only **$149.95** + $2.00 S&H (USA/Canada), $10.00 (foreign). Payment by MO, check, VISA, MasterCard, COD or Company PO. Rush orders accepted ($15.00 S&H; USA/Canada only). Rush orders received by noon will be delivered the next business day (to most locations).

Order Desk: 1-800-267-0668

The sample screen display shown below is typical of what you see while editing a chart. Other screen displays are provided for entering titles, changing options, getting "help" and so on.




***HavenTree Software Limited***
*P.O. Box 1093-P*
*Thousand Island Park, NY 13692*
*Information: (613)544-6035 ext 49*

CIRCLE 201 ON READER SERVICE CARD


## ■ CONNECTIVITY CLINIC

*economics. If the world's experts on the subject got together they would never reach an agreement. Properly used, Innovative's LPT provides a valid standard for comparison among networks.*

*Since you did not specify what functions you want your network to perform (e.g., DBMS, word processing, spreadsheet), I can only suggest a test using the "integrated applications" mode of the LPT.*

*Here is how I suggest you set it up: You should supply five computers using the IBM PC standard bus, MS-DOS, and 8088 processors running at 4.77 MHz. Also provide one personal computer using the IBM PC AT data bus, MS-DOS, and an 80286 processor running at 6 MHz. This machine will be the server. Your prospective vendors provide the network interface cards, networking software, and all network cable and hardware.*

*Configure the LAN Performance Test with four stations operating in the "integrated applications" mode at a "medium" usage level. The fifth station is the control test station. State in your specifications that the time reported for the test to be run on the control test station should not exceed a reported average test run for five cycles of 500 seconds.*

*Specifying this level of performance should guarantee that you get a system in the class of Novell's* NetWare *or 3Com's* 3+Share *running on 3Com's EtherLink; in other words, high performance. Many vendors should be able to provide systems up to this level of performance. By the way, I strongly suggest you include training, automatic software updates, and both hardware and software maintenance in your statement of work. You don't want to be left with an orphan. (Innovative Software, Lenexa, Kans.; (800) 438-7627.)*

### NETWORK YOUR QUESTIONS

Connectivity Clinic gives you practical solutions to networking problems of all types. We'll pay $50 for any tips we print, plus an extra $25 if you submit your letter on a disk—and we'll gladly answer any questions you have, at no charge. Mail your contributions to Connectivity Clinic, *PC Magazine*, One Park Avenue, New York, NY 10016, or contact Frank J. Derfler, Jr., via MCI Mail (use Derfler's box named CONNECTIVITY CLINIC). PC

# Boeing Calc. The next step.

Boeing Calc is the next logical step in spreadsheet evolution. It's a unique program that lets you build related spreadsheets as separate pages within a single file.

The result: quick, accurate consolidations between pages automatically even if the pages are formatted differently. *Business Software* magazine says that once you try this faster, more efficient spreadsheet you'll never go back to your old one.

And you won't exceed memory limits or need expensive expansion boards for your IBM PC XT,® AT® or compatible. Boeing Calc memory management techniques let you use its 16,000 rows, columns and pages to create files as large as 32 MB.

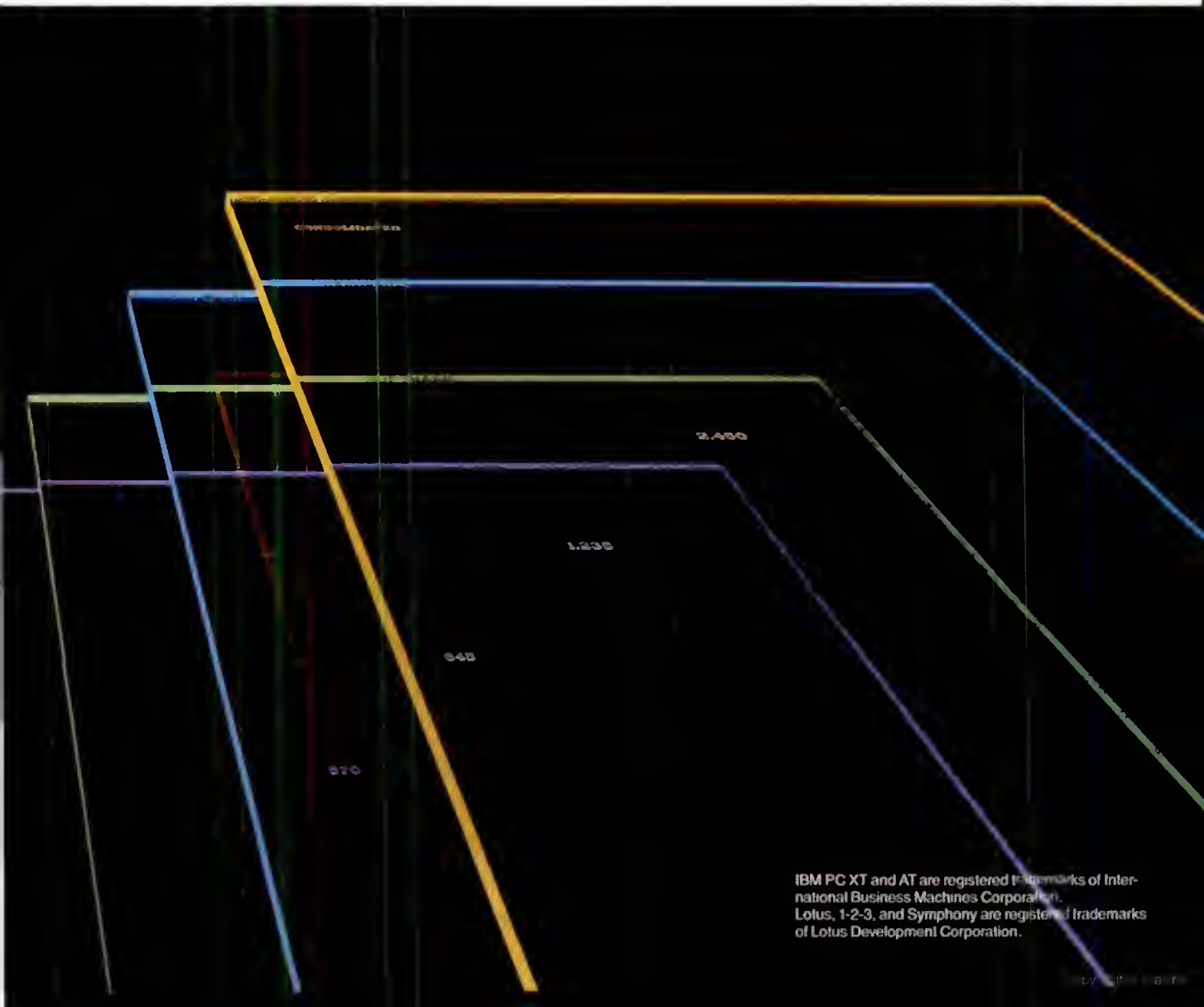
The multi-user version supports Local Area Networks. As many as 32 users can access the same spreadsheet at the same time, with separate security levels for each. Right down to the cell. The system administrator has full control and can match task and security requirements to each user.

You can automatically import 1-2-3® and Symphony® files directly — formulas, macros and all. Boeing Calc's command structure works like Lotus® and permits you to move quickly to its more efficient command option.

For a demo diskette and the nearest dealer, call 1-800-551-0800, Ext. 12. Or write Boeing Computer Services, P.O. Box 24346, M/S 7W-05, Seattle, WA 98124-0346.

**BOEING**

CIRCLE 129 ON READER SERVICE CARD




IBM PC XT and AT are registered trademarks of International Business Machines Corporation.
Lotus, 1-2-3, and Symphony are registered trademarks of Lotus Development Corporation.

# CMO. Doing business-to-b

## MONITORS.

**Amdek**
Video 310A Amber.....$139.00
410 TTL Mono.....149.00
Color 600 RGB, IBM CGA.....399.00
Color 722 RGB, CGA/EGA.....479.00
**Blue Chip**
12" Green TTL.....79.99
12" Amber TTL.....99.99
**Magnavox**
8CM515 RGB Monitor-80.....289.00
7BM613 12" TTL Green.....99.99
7BM623 12" TTL Amber.....99.99
8CM540 14" EGA.....519.00
8CM873 14" Multimode.....549.00
**Mitsubishi**
XC 1409C.....349.00

**NEC 1280/85 12" TTL Amber or Green $99**

JC-1401P-3A RGB.....569.00
**Polaroid**
Computer Imaging Pallette.....1399.00
**Princeton Graphics**
MAX-12 12" Amber TTL.....169.00
HX-12 12" Color RGB.....429.00
HX-12E 12" RGB/EGA.....499.00
SR-12 12" RGB Color.....529.00
**Texen**
Model 124 12 " Amber.....119.00
Model 650 12" RGB Color.....549.00

## DRIVES.

**CMS**
Drive Plus 20MB Int. Card.....$399.00
T-120 20MB Tape-Backup.....449.00
T-160 60MB Tape-Backup.....699.00
**Everex**
Stream 20 20MB Tape-Backup..569.00
**Iomega**
A110H 10 + 10 Bernoulli Box.1749.00
A220H 20+20 Bernoulli Box...2499.00
**Irwin**
110D 10 MB Tape Backup.....319.00
120D 20 MB Tape Backup.....449.00

**Mountain Dual 20 MB Bernoulli $2199**

**Mountain**
20 MB Drive Card.....489.00
30 MB Drive Card.....599.00
40 MB Tape Back-up.....539.00
60 MB Tape Back-up.....1149.00
5¼" BETA Bernoulli.....1499.00
**Priam**
Priam ID-60AT Tape-Backup.....979.00
**Racore**
Jr. Expansion Chassis w/DMA...329.00
**Seagate**
ST-225 20MB w/Controller.....369.00
**Sysgen**
Smart Image 20 MB.....569.00
Qic-File 60 MB.....999.00

## SOFTWARE.

**DAC Software**
Easy Accounting.....$48.99
**5th Generation**
Fastback.....89.99
**IMSI**
Optimouse w/Dr. Halo.....99.00
**Logitech**
C7 Mouse w/Software.....99.99
**Lotus**
Lotus 1•2•3.....329.00
Symphony.....439.00
**MECA**
Managing Your Money.....119.00
**MicroPro**
Wordstar 2000+.....289.00
Professional 4.0 w/GL Demo.....239.00
**Microrim**
R:Base System 5.....339.00
**Micro Soft**
Micro Soft Word 3.1.....279.00
Micro Soft Mouse.....129.00
**Microstuf**
Crosstalk XVI.....89.99
**Migent**
Ability.....69.00
**Multimate International**
Multimate 3.3.....249.00
Multimate Advantage.....309.00
Advantage Keyboard.....269.00
**Norton Software**
Norton Utilities 3.1.....59.99
**Software Publishing Group**
PFS:First Choice.....99.99
PFS:Professional Write.....119.00
PFS:Professional File.....149.00
Harvard Total Project Mgr. II.....359.00
Clickart Personal Publisher.....115.00
**Symantec**
Q & A - The Data Base.....289.00

## DISKETTES.

**Mexell**
MD1-M SS/DD 5¼".....$8.99
MD2-DM DS/DD 5¼".....10.99
MD2-HDM Hi Density 5¼".....21.99
MFD2-DDM DS/DD 3½".....21.49
**Sony**
MD1D SS/DD 5¼".....7.99
MD2D DS/DD 5¼".....9.49
MD2HD Hi Density 5¼".....20.49
MFD-1DD SS/DD 3½".....12.99
MFD-2DD DS/DD 3½".....19.99

## SOFTWARE.

**Ashton Tate**
D Base III+.....$399.00
**American Small Business**
Pro-Design II CAD.....249.00
**Ansa**
Paradox.....459.00
**Borland**
Reflex.....87.99
**Central Point Software**
Copy II PC.....24.99
PC Option Board.....84.99

**The Software Group Enable 2.0 $339**

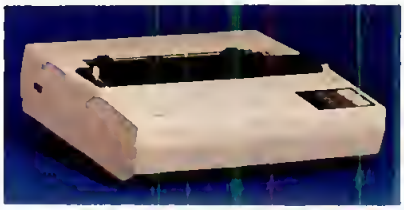
**Word Perfect Corp.**
Word Perfect 4.2.....209.00

# COMPUTER MAIL ORDER

# usiness, person to person.

## PRINTERS.

**Canon**
LBP-8A1 Laser, 8 Page/Min...$1899.00
**Citizen**
MSP-10 160 CPS, 80 Col.....299.00
MSP-20 200 CPS, 8K Buffer.....349.00
Premier 35 35 CPS Daisywheel.499.00
**C.Itoh**
310 XP Epson/IBM 80 Col.....call

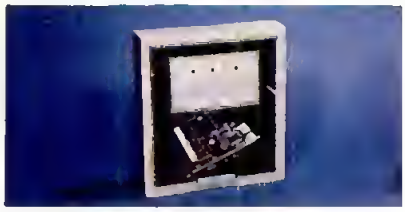


**Epson EX-800**
**300 cps Dot Matrix $439**

**Epson**
FX-86E 240 CPS, 80 Col.....call
FX-286E 240 CPS, 132 Col.....call
EX-1000 300 CPS, 132 Col.....599.00
LQ-800 180 CPS, 24 Pin Head.....call
LQ-1000 180 CPS, 132 Col.....call
**Hewlett Packard**
ThinkJet.....399.00
**Juki**
5510C Color Dot Matrix.....349.00
6000 10 CPS, Letter Quality.....189.00
6100 18 CPS, Letter Quality.....369.00
6300 40 CPS, Diablo Compatible649.00
**NEC**
P660, Pinwriter 80 Col.....call
P760 Pinwriter 132 Col.....call
P560XL Pinwriter 132 Col.....999.00
3550 35 CPS, Spinwriter.....779.00
**Okidata**
ML-192+ 200 CPS, 80 Col.....369.00
ML-193+ 200 CPS, 132 Col.....call
**Panasonic**
KX-1080i 120 CPS, 80 Col.....219.00
KX-1091i 160 CPS, 80 Col.....299.00
KX-1092i 240 CPS, 80 Col.....359.00
**Star Micronics**
NX-10 120 CPS, 80 Col.....219.00
NX-15 120 CPS, 132 Col.....369.00
**Texas Instruments**
TI-865 150 CPS, 132 Col.....749.00
**Toshiba**
P321 216 CPS, 24 Pin Head.....479.00
P351-II 300 CPS, 24 Pin Head..999.00

## MULTIFUNCTION CARDS.

**AST**
Six Pak Plus PC/XT.....$169.00
Advantage IBM/AT 128K.....339.00
Rampage-PC.....279.00
Rampage-AT.....429.00
**Boca Research**
Top Hat.....128K expansion.....99.00
Boca I/O Half Card.....$89.00
**DCA**
IRMA 3278 I/O.....839.00
**Everex**
EV-640 Edge Card.....259.00
EV-653 Micro Enhancer EGA....219.00
**Fifth Generation**
Logical Connection 256K.....299.00
**Hercules**
Color Card.....159.00
Graphics Card.....199.00
Graphics Card Plus.....209.00
**IDEAssociates**
IDE-5251 Emulation Board.....579.00
**Intel**
8087 Math Co-processor.....119.00
1110 PC-Above Board.....279.00
2110 PS/AT Above Board.....369.00
Inboard 386.....NEW
**NEC**
GB-I EGA Adapter.....399.00
**NSI**
Smart EGA.....319.00
**Quadram**
Quad EGA+ Graphics Adapter.329.00
Silver Quadboard.....129.00
Expanded Quadboard.....119.00



**Video-7**
**Video EGA Deluxe $379**

Vega Video Adapter-EGA.....289.00
**Zuckerboard**
Color Card.....89.99
576K Memory Card.....59.99
Short I/O C,S,P.....99.99
Tandy DMA Memory.....69.99

## MS/DOS SYSTEMS.

**PC-T00 20 Meg**
**XT-Compatible $999**

**Blue Chip**
Desktops.....call
**Commodore**
Amiga 2000 PC.....call
**IBM**
XT-Single Drive System.....1169.00
AT-Single Drive System.....2599.00
**Leading Edge**
Model D Desktops.....call
**NEC**
APC-IV 286 Desktop.....call
Multispeed Lap Top.....call
**Panasonic**
Business Partner.....799.00
**Sperry**
Micro IT System.....call
**Toshiba**
1100 Plus Lap Top.....1599.00

## MODEMS.

**Anchor**
Express-i 1200 Half-Card.....$149.00
Express 1200 Baud.....199.00
Lightening 2400 Baud.....319.00
Lightening 24 f/i.....359.00
Lightening-i 2400 Baud.....299.00
**Best Products**
Smart 1 1200, Half Card w/Soft.129.00
**Everex**
Evercom 920 1200 Baud Int.....109.00
**Hayes**
Smartmodem 1200 External.....389.00
Smartmodem 1200B.....359.00
Smartmodem 2400.....599.00
**Practical Peripherals**
Practical Modem 1200 External.159.00
Practical Modem PC-1200.....139.00
Multifunction Modem.....259.00
**U.S. Robotics**
1200 Baud Internal.....119.00
2400 Baud Internal.....189.00

**In the U.S.A. and in Canada**

# Call toll-free: 1-800-233-8950.

**Outside the U.S.A. call 717-327-9575 Telex 5106017898**

**Educational, Governmental and Corporate Organizations call toll-free 1-800-221-4283**

**CMO. 477 East Third Street, Dept. B105, Williamsport, PA 17701**

**ALL MAJOR CREDIT CARDS ACCEPTED.**

**POLICY:** Add 3% (minimum $7 00) shipping and handling. Largar shipments may require additional charges. Personal and compeny checks require 3 weeks to clear. For faster delivery use your credit card or send cashier's check or bank money order. Pennsylvania residents add 6% sales tax. All prices are U.S.A. prices and are subject to change and all items are subject to availability. Defective software will be replaced with the sama item only. Hardware will be replaced or repaired at our discretion within the terms and limits of the manufacturer's warranty. We cannot guarantee compatibility. All sales are final and returned shipments are subject to e restocking fee.

CIRCLE 183 ON READER SERVICE CARD

# THE INTELLIGENT CHOICE...

## IMS-286
10 MEGAHERTZ

**$1035** Base System

- Intel 80286 processor running at 10MHz, switch selectable to 6MHz
- Phoenix BIOS
- 512KB RAM expandable to 1MB on system board
- 1.2MB diskette drive
- Dual diskette drive/fixed disk controller
- AT-style keyboard
- Clock-calendar with battery backup
- 200-watt power supply
- Illustrated installation and operations manual

With 20MB Seagate fixed disk drive, 65ms access time **$1335**
With 30MB Seagate fixed disk drive, 40ms access time **$1635**
With 42MB MiniScribe fixed disk drive, 28ms access time **$1695**
With 70MB MiniScribe fixed disk drive, 28ms access time **$1935**

### Monographics Systems

All monographics systems include a high-resolution monochrome graphics adapter board and a twelve-inch amber monochrome monitor.

With 20MB Seagate fixed disk drive, 65ms access time **$1535**
With 30MB Seagate fixed disk drive, 40ms access time **$1835**
With 42MB MiniScribe fixed disk drive, 28ms access time **$1895**
With 70MB MiniScribe fixed disk drive, 28ms access time **$2135**

### EGA Systems

All EGA systems include an enhanced graphics adapter video card and a fourteen inch high-resolution EGA color monitor.

With 20MB Seagate fixed disk drive, 65ms access time **$1935**
With 30MB Seagate fixed disk drive, 40ms access time **$2235**
With 42MB MiniScribe fixed disk drive, 28ms access time **$2295**
With 70MB MiniScribe fixed disk drive, 28ms access time **$2535**

**Memory and Math Coprocessors**
256K Chips (150ns)...$29
256K Chips (120ns)...$35
Intel 80287-8 math coprocessor...$269

**Diskette Drive**
360KB diskette drive for your IMS-286.. $109

**AT I/O Board**
Communications support: one serial and one parallel port...$75

**AT Multifunction Card**
0K expandable to 2MB, one serial port, one parallel port, one game port...$159

**Terms:** No surcharge for credit card orders (MasterCard and VISA) COD shipments (cashiers check) at no additional cost We accept purchase orders from Fortune 500 companies, Universities and Institutions

**Shipping.** Free fully insured UPS ground shipping in continental U S A on all products except HP Laser Printers (add $50) Two day shipping available (extra charge applies)

**Warranty.** IMS products have a one year limited warranty (parts and labor included shipping not included) Brand name products have a 30 day IMS warranty Manufacturer warranty may also apply

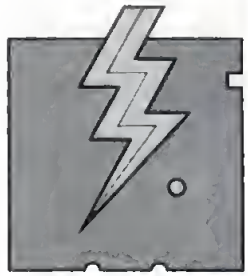
To Order Call Toll Free:
**800-247-3084**
For Product Information & In Texas Call:
**512-250-8271**

IMS Intelligent Micro Systems
1633 Babcock, Suite 424 San Antonio, Tx. 78229

CIRCLE 212 ON READER SERVICE CARD

■ NEIL J. RUBENKING

# TURBO POWER USER



*Creating BASIC and Turbo programs that automatically generate .COM files; shunting output to different devices; determining how much space remains on your disks.*

## I/O CHOICE

Have you ever wanted to give your Turbo Pascal procedure the choice between displaying on the screen or printing without having to duplicate all of the code, changing `writeln(...)` to `writeln(lst,...)`? The Turbo logical I/O device identifiers (lst, con, aux, usr, kbd, trm) point to information that is a subset of that contained in a regular file interface block. If you declare a file variable of type TEXT and have it share the information in the logical I/O devices, then writing to that "file" will send the output to the place the logical devices would.

Figure 1 shows the easiest way to do this. Simply call the procedure with an actual parameter of "con" or "lst". The formal parameter in the procedure must be a file variable of type TEXT and must be a VAR parameter. Making it a VAR parameter means it shares the information at the address of the formal parameter, in this case a logical I/O device.

If you want to change from one device to another while in a procedure—perhaps in response to some user input—I've discovered another way to share the information in the file interface block. The Turbo MOVE command will make a copy of any information, moving the specified number of bytes from one address to another. Figure 2 shows how the four bytes of the "con" or "lst" logical device can be copied to a file variable of type TEXT. Subsequent writes to that "file" will be directed to the device chosen.

Douglas K. Hansen
Salt Lake City, Utah

```
{ example 1 }
var
  atext : text;

  Procedure Out(var device : text);
  Begin
    Writeln(device,'This will be sent to the device chosen.');
    { . . . }
  End;

Begin
  assign(atext,'ATEXT.TXT'); rewrite(atext);
  Out(con);   { output to the console (screen)          }
  Out(lst);   { or send it to the list device (printer). }
  Out(atext); { or even to a disk file.                  }
  close(atext);
End.
```

**Figure 1:** *How to send Turbo's output to the device of your choice.*

```
Var
  device : text;

Begin

  move(con,device,4);
  Writeln(device,'Send this to the console (screen).');

  move(lst,device,4);
  Writeln(device,'Send this to the list device (printer).');

End.
```

**Figure 2:** *Another way to send output to the device of your choice.*

## DETERMINING DISK SPACE

While developing a Turbo program, I found it necessary to determine the amount of free space remaining on disk. I was pleasantly surprised to find that all I needed to do was use Turbo's INTR procedure to call DOS function $36 and perform the appropriate calculation. The program shown in Figure 3 demonstrates the procedure I implemented.

Steve Hall
Beaverton, Oregon

*In order to make an already good program*

## ■ TURBO POWER USER

*even better, I took the liberty of adding the function "unsigned" to Mr. Hall's program, and I applied it to the real values extracted from the output registers. It would take a very large disk to get values over $7FFF, but the betting odds are high that at least one of our readers is bound to have such a disk. While I was at it, I also changed the error return from 0 to −1, since a disk might really have 0 bytes free. Unless otherwise specified, the program assumes the default drive.*

### BASDATA

I've frequently seen BASIC programs in *PC Magazine* that generate .COM files from a series of DATA statements. I've written a Turbo program (shown in Figure 4) that generates the text of the BASIC program itself (including those tedious DATA statements), which in turn will re-create the original .COM file faithfully. The BASIC program can, of course, be subse-

```
PROGRAM Free_Space_Demo;
VAR DriveLetter : Char;

  FUNCTION GetFreeSpace(TheDrive : Char) : Real;
    (* Pass in the desired drive designator A,B,C etc.   *)
    (* and return the number of free bytes left on disk. *)
    (* If TheDrive is blank then use the default drive.  *)

  TYPE BiosParamType = RECORD
                         AX, BX, CX, DX, BP, SI, DI, DS, ES, FLAGS : Integer;
                       END;
  VAR
    BiosParam           : BiosParamType;
    Drive               : Integer;
    Available_Clusters  : Real;
    Bytes_Per_Sector    : Real;
    Sectors_Per_Cluster : Real;
    Total_Clusters      : Real;

    FUNCTION unsigned(I : Integer) : Real;
    BEGIN
      IF I < 0 THEN unsigned := 65536.0+I
      ELSE unsigned := I;
    END;

  BEGIN
    TheDrive := UpCase(TheDrive);
    IF TheDrive = ' ' THEN Drive := 0       (* 0 = default drive   *)
    ELSE Drive := 1+Ord(TheDrive)-Ord('A'); (* A: = 1, B: = 2, &c. *)

                                                          (continues)
```

**Figure 3:** *How to determine the amount of free space left on a disk.*


Attention all FX80, FX100, JX, RX, & MX owners:

**You already own half of a great printer**

Now Only $79.95

Now for $79.95 you can own the rest. You see, today's new dot matrix printers offer a lot more.

Like an NLQ mode that makes their letters print almost as sharp as a daisy wheel. And mode switching at the touch of a button in over 160 styles. But now, a Dots-Perfect upgrade kit will make your printer work like the new models in minutes— at a fraction of their cost.

And FX, JX and MX models will print the IBM character set, too.

So, call now and use your Visa, MasterCard, or AmerEx. Don't replace your printer, upgrade it!

**1-800-368-7737**

**(Anywhere in the United States or Canada)**

Sample of letter with Dots-Perfect

**Dots-Perfect™**

Sample of letter without Dots-Perfect

**Dresselhaus**

8560 Vineyard Ave., Ste. 405, Rancho Cucamonga, CA 91730 (714) 945-5600

IBM is a registered trademark of International Business Machines Corp
GraFtrax™ is a trademark of Epson America Inc
Epson is a registered trademark of Epson America Inc

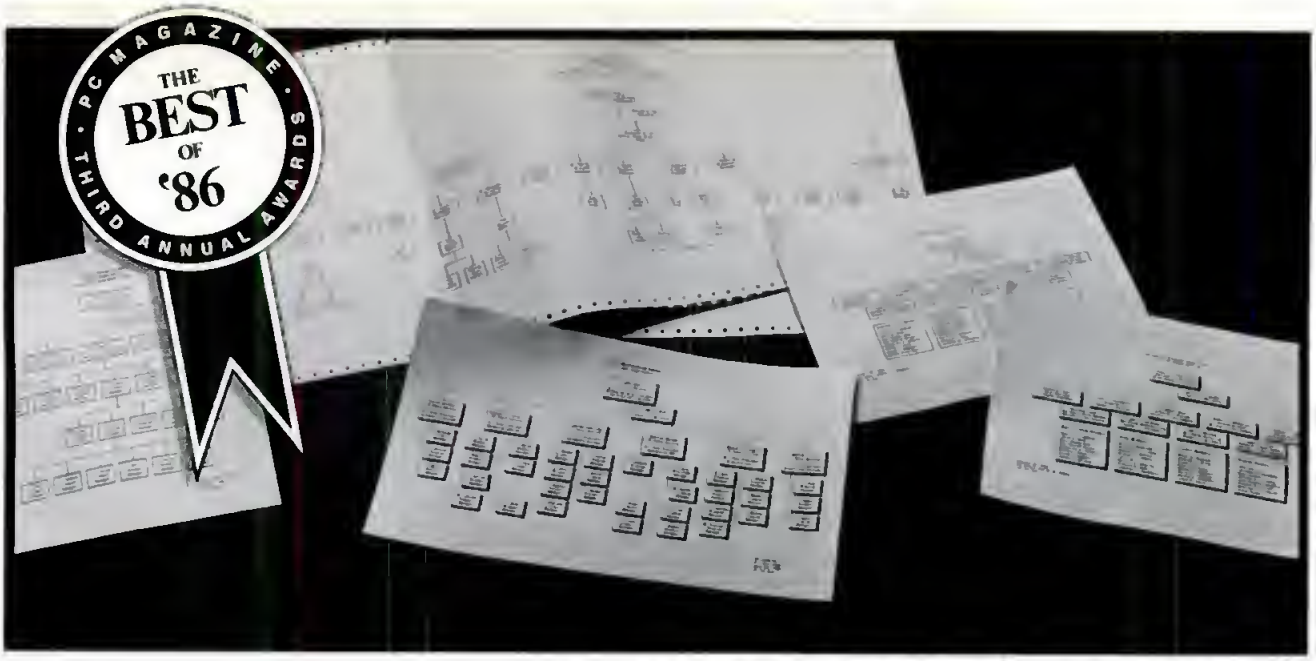
An upgrade kit for EPSON FX, JX, RX, & MX printers

CIRCLE 295 ON READER SERVICE CARD



**MOVING?**

Please write to: PC Magazine, Box 2445, Boulder, CO 80322. Include your mailing label from a recent issue of PC Magazine for faster service. Please allow up to 60 days for change of address to take place.




Org Plus software creates org charts in minutes. Use any IBM PC or compatible.

# The quick, professional way to show who's boss

All managers find organization charts essential for planning, budgeting and communicating. Why is Org Plus™ such an outstanding way to create these charts?

"I can get from an idea to a printed copy of a fairly complex org chart in 30 minutes or less," says Jim Seymour in *PC Week*.

## Just enter names

Simply type names, titles, and comments into a display that shows each manager and their subordinates. Then let Org Plus do the hard work.

Org Plus automatically draws and spaces the boxes, centers the text, and precisely lays out the connecting lines. The chart is so exact you can use it in any situation, no matter how formal.

Yet, with a typical printer you have your chart in only 3 minutes.

## Flexible

Choose from 7 chart styles and 8 box styles. Try one. Then try another with just a few keystrokes. You can even mix different styles in a single chart.

Charts are easily updated to keep pace with changing organizations. Add, delete or move employees—even entire departments. Org Plus is so fast you can use it to create alternatives *before* reorganizing.

Use Org Plus for planning and budgeting, too. Boxes can hold up to 6 lines of text, plenty of room to include salaries or expenses.

Even small organizations find an org chart helpful for communicating with vendors and other departments. As you grow, charts can be as wide as necessary with hundreds of employees.

In addition, Org Plus is designed so you don't need a secretary or an art department to do your charts. But, it can make their job easier, too.

## Rave reviews

"The charts are perfectly laid out and attractive." —Glenn Hart, *PC Magazine* 2/25/86

"The program is so simple to use that you'll find little use for either the manual or the on-line help screens."—Henry F. Beechhold, *Computer Consultant* 6/86

## Try Org Plus risk free

Order today. The cost is less than doing one simple chart by hand.

30 day money back guarantee if you are not satisfied for any reason.

To order, call 415-794-6850.

**Org Plus** for *quick* and *easy* organization charts

**$69.95** plus $3.00 shipping, $72.95 total. CA residents add $4.90 sales tax.

Banner Blue P.O. Box 7865 Fremont, CA 94537 415-794-6850

Send Org Plus for my IBM PC or compatible. Requires 256Kb RAM and a printer or HP plotter.

$69.95 plus $3.00 shipping, $72.95 total. In CA add $4.90 tax. Outside US—Int'l Money Order or Credit Card only.

_ VISA _ MC _ AmerEx _ Check (US only) _ PO (US only)

Card No. _____

Expires _____ Phone _____

Signature _____

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

PC0512

Reviewers' comments are based on version 1A of the program. Org Plus works on an IBM PC/XT/AT or 100% compatible computer with 256 Kb of RAM. DOS version 2.0 or higher and a printer or HP plotter are required. Compatible with Sideways.™ Org Plus is not copy protected. A 70 page User's Guide and telephone support are included. IBM is a registered trademark of International Business Machines Corp. Sideways is a trademark of Funk Software. © 1986 Banner Blue Software Incorporated

CIRCLE 367 ON READER SERVICE CARD

# PC MAGAZINE GUARANTEES IN-DEPTH REVIEWS

PC MAGAZINE knows that it's not easy finding out what's new, better, faster, quieter, cheaper, more compatible or more expandable. That's why a subscription to PC MAGAZINE is the best way to stay abreast of what's available for IBM MS-DOS systems.

PC MAGAZINE's editors and columnists keep you fully informed about what you can expect from PC products—and which are the best for the business tasks you have to accomplish. And, when you have to solve applications problems, we're there to back you up.

You'll find the clearly written product reviews and evaluations by PC Labs—the only independent state-of-the-art testing facility in computer publishing—helpful solutions to complicated applications and a resource that will help you purchase PC products for your business with confidence.

Bring the most experienced and sought-after staff of PC professionals into your office 22 times a year with PC MAGAZINE. Subscribe today and save up to 62% off the annual single-copy price!

One year—22 issues—only
$27.97 SAVE 57%
Two years—44 issues—only
$49.97 SAVE 62%

**Call toll-free 1-800-852-5200 for faster service.**

4Z080




## ■ TURBO POWER USER

```
    WITH BioePeram DO
      BEGIN
        AX := $36 SHL 8;      (* $36 = DOB free epace service   *)
        DX := drive;
        INTR($21, BiosParam);
    IF AX <> $FFFF THEN   (* if $FFFF ie returned then en error occured *)
        BEGIN
          Aveilable_Cluetere  := uneigned(BX);
          Bytee_Per_Sector    := uneigned(CX);
          Totel_Cluetere      := uneigned(DX);
          Bectore_Per_Clueter := uneigned(AX);
          GetFreeSpace := 1.0 * Sectors_Per_Clueter * Bytes_Per_Sector *
                          Aveileble_Cluetere;
        END
      ELSE (* elee an error occured and cannot determine free space *)
        GetFreeSpace := -1
    END; (WITH BioeParam)
  END;

BEGIN                          (* m e i n    p r o g r e m *)
  WriteLn('Enter drive letter :');
  ReedLn(DriveLetter);
  OriveLetter := UpCase(OriveLetter);
  IF OriveLetter IN [' ', 'A'..'Z'] THEN
    BEGIN
      Write('The free epace eveileble on drive ', DriveLetter);
      WriteLn(' = ', GetFreeSpace(DriveLetter):10:0, ' bytee.');
      WriteLn

    END;
  END.
```

*(Figure 3 ends)*

```
Program BAS_Date;

VAR
  InFile                              : FILE OF byte;
  OutFile                             : Text;
  byteRecord                          : byte;
  filename                            : STRING[64];
  i, j                                : Integer;
  CheckSum, LineNumber, NumDateLinee : Integer;

TYPE
  string2 = STRING[2];

  FUNCTIDN Byte2Bex(B : Byte) : etring2;
  CONST
    HexDigit : ARRAY[0..15] OF Cher = '0123456789ABCDEF';
  BEGIN
    Byte2Bex := HexDigit[B SHR 4] + HexDigit[B AND $F];
  END;

  PROCEDURE Initielize;
  BEGIN
    Write('Enter filename ".COM" eseumed: ');
    ReedLn(filename);
    Assign(InFile, filename+'.com');
    Reset(InFile);
    Aesign(OutFile, filename+'.BAS');
    Rewrite(OutFile);
    CheckSum := 0;
    j := 0;
    LineNumber := 1001;
    NumDataLines := FileSize(InFile) DIV 16;
    IF FileSize(InFile) MOD 16 > 0 THEN NumDetelinee := Bucc(NumDateLinee);
  END;

  PROCEDURE WriteMAIN;
  BEGIN
    WriteLn(DutFile, '110 PRINT "Checking DATA etetemente for errore..."');
    WriteLn(DutFile, '120 FOR L = 1 TO ', NumDateLinee, ' :FOR B = 1 TO 16');
    WriteLn(DutFile, '130 READ BYTE$: LTOTAL = LTOTAL + VAL("&h"+BYTE$):NEXT');
    WriteLn(DutFile, '140 READ CHECKSUM: IF CHECKSUM = LTOTAL THEN 170');
    WriteLn(DutFile, '150 PRINT "DATA error in line #", L + 1000');
    WriteLn(DutFile, '160 PRINT "Program aborted": END');
    WriteLn(DutFile, '170 LTOTAL = 0: NERT: RESTORE');
    Write  (OutFile, '180 OPEN "', filename, '.COM" AS #1 LEN = 1');
    WriteLn(OutFile, ':FIELD #1,1 AS D$');
    WriteLn(DutFile, '190 FOR L = 1 TO ', numDateLinee, ' : FOR B = 1 TO 16');
    WriteLn(DutFile, '200 READ BYTE$: LSET D$ = CHR$(VAL("&h"+BYTE$))');
```

*(continues)*

**Figure 4:** *BASDATA.PAS generates a BASIC program from a .COM file. The BASIC program will re-create the original .COM file.*

```
  WriteLn(OutFile, '210 PUT #1 : NEXT: READ CHECKSUM$: NEXT : CLOSE');
  Write  (OntFile, '220 PRINT "', filename, '.COM  eucceeefully creeted."');
  WriteLN(OntFile, ': END');
END;

PROCEDURE WriteDATA;
  BEGIN
    Write(OutFile, LineNumber, ' DATA ');
    FOR i := 1 TO FileSize(InFile) DO
      BEGIN
        j := Succ(j);
        Reed(InFile, byteRecord);
        CheckSum := CheckSum+byteRecord;
        Write(OutFile, byte2bex(byteRecord));
        IF j < 16 THEN Write(OntFile, ', ')
        ELSE
          BEGIN
            WriteLn(OutFile, ', ', CheckBum);
            j := 0;
            LineNumber := Succ(LineNumber);
            Write(OutFile, LineNumber, ' DATA ');
            CheckSum := 0;
          END;
      END;
    IF j <> 0 THEN
      BEGIN
        FOR i := j+1 TO 16 DO
          BEGIN
            Write(OutFile, '00');
            IF i < 16 THEN Write(OntFile, ', ')
              ELSE WriteLn(OutFile, ', ', CheckBum);
          END;
      END;                          { If j <> 16 }
    WriteLn(filename+'.BAS', ' Written ee e BASIC ASCII file.');
  END;

BEGIN
  Initielize;
  WriteMAIN;
  WriteDATA;
  Cloee(OutFile);
END.
```

*(Figure 4 ends)*

```
Program PAS_Data;

VAR
  InFile                                : FILE OF byte;
  O                                     : Text;
  byteRecord                            : byte;
  filename                              : STRING[64];
  i, j                                  : Integer;
  CheckSum, LineNumber, NumDateLinee : Integer;

TYPE
  string2 = STRING[2];

  FUNCTION Byte2Bex(B : Byte) : string2;
  CONST
    BexDigit : ARRAY[0..15] OF Cher = '0123456789ABCDEF';
  BEGIN
    Byte2Bex := HexDigit[B SHR 4] + HexDigit[H AND $F];
  END;

  PROCEDURE Initieliee;
  BEGIN
    Write('Enter filename ".COM" exeumed: ');
    ReedLn(filename);
    Aseign(InFile, filename+'.com');
    Reset(InFile);
    Aesign(O, filename+'.PAS');
    Rewrite(O);
    CheckSum := 0;
    LineNumber := 1;
    j := 0;
    NumDataLinee := FileSize(InFile) DIV 16;
    IF FileSize(InFile) MOD 16 > 0 THEN NumDetalinee := Succ(NumDataLinee);
  END;

  PROCEDURE WriteMAIN;
  BEGIN
    WriteLN(O,'PROGRAM Make_Com_File;');
    WriteLN(O,'VAR');
```

*(continues)*

**Figure 5:** *PASDATA.PAS turns a .COM file into a .PAS file that will re-create the .COM file.*


FOR RETAILERS ONLY:

**BECAUSE YOU SELL ONE OF THESE...**

**YOU SHOULD SELL THIS...**

Bring PC MAGAZINE, the "silent salesman," into your store and provide your customers with clearly written comparative reviews of the hardware and software you carry!

Knowledgeable PC users turn to PC MAGAZINE 22 times a year for in-depth evaluations conducted by PC Labs, the publishing industry's only independent product tester.

Increase the sale of your inventory and earn additional profits with PC MAGAZINE. For more information on how you can sell the profit leader, call (212) 503-5380 or write:

Carol Benedetto—
Retail Sales &
Marketing Manager
Ziff-Davis Publishing Company
One Park Avenue
New York, NY 10016

## ■ TURBO POWER USER

■ I wondered how people created those difficult DATA statements—this program makes it easy.

quently edited to include specific comment lines or additional subroutines that might modify the DATA statements themselves, and so on.

John A. Bisson
Burlington, Vermont

*I wondered how people created those difficult DATA statements—this program makes it easy. But if you have Turbo Pascal, you might also want to generate a Tur-*

```
  WriteLN(O,'  L, B, LT : integer;');
  WriteLN(O,'  O          : file of byte;');
  WriteLn(O,'CONST');
  Write  (O,'  date : array[1..',18*NumDateLines+1);
  WriteLB(O,'] of byte =');
  Write  (O,'( 1)');
END;

PROCEDURE WriteDATA;
BEGIN
  While not EOF(InFile) DO
    BEGIN
      j := Succ(j);
      Read(InFile, byteRecord);
      CheckSum := CheckSum + byteRecord;
      Write(O, '$',byte2hex(byteRecord),',');
      IF j = 16 THEN
        BEGIN
          WriteLn(O, Lo(CheckSum):3,',', Hi(CheckSum):3,',');
          j := 0;    CheckSum := 0;
          LineNumber := succ(LineNumber);
          Write(O,'{',LineNumber:2,') ');
        END;
    END;
  IF j <> 0 THEN
    BEGIN
      FOR i := j+1 TO 16 DO
        BEGIN
          Write(O,'$00,');
          IF i = 16 THEN
            WriteLn(O, Lo(CheckSum):3,',', Hi(CheckSum):3,',');
        END;
    END;
  WriteLn(O,'0);');
```

*(Figure 5 continues)*


IMPORTANT NOTICE

introducing

TO P.C., X.T. & TURBO USERS

THE ULTIMA SUPER BIOS CHIP MAKES YOUR P.C. 5.2 TIMES FASTER!

After 2 years of research the ULTIMA Super Bios Chip is finally here, and virtually 100% IBM PC compatible. • You Can install the ULTIMA yourself in just minutes • Fully legal•international copy right•Reduces wait time drastically.

SPEED COMPARISONS USING D.O.S. 3.1

| BIOS TYPE | FORMAT | DISK COPY | COLDBOOT |
|---|---|---|---|
| IBM | 1:46 0:27 | 2:00 0:30 | 1:31 0:16 |

(Time in Minutes / Seconds)

RELATIVE INDEX TESTED WITH NORTON UTILITIES 5 COMMAND

| BIOS | 8088 | V20 | TURBO | AMD AT* |
|---|---|---|---|---|
| IBM | 1.0 | 1.6 | N/A | N/A |
| Phoenix | 1.0 | 1.6 | 1.6 | 2.9 |
| | 1.0 | 1.7 | 1.7 | 3.0 |
| ULTIMA | 1.7 | 2.2 | 3.0 | 5.2 |

SPEED UP YOUR PC -XT BY 5.2 TIMES

ORDER YOUR ULTIMA TODAY
CALL TOLL FREE (IN CANADA & U.S.A.):

$79.00

1-800-661-6969
DEALER ENQUIRIES WELCOME

ULTIMA is approved by IBM Canada Ltd.

MARKETED BY Multitech ELECTRONICS INC.

$99.00 in CANADA
MASTERCARD VISA
C.O.D. MONEY ORDER

*As tested with V20 and ULTIMA activated on PC - XT
*Phoenix, ULTIMA & PC - XT are registered trademarks

CIRCLE 506 ON READER SERVICE CARD



Laptop Users:

"This thing is fabulous"
John C. Dvorak*

We couldn't agree more with John Dvorak, and couldn't have said it better: "Buy the Brooklyn Bridge from White Crane Systems.... It's a combination cable and software package that hooks the Toshiba or Zenith (and other MS-DOS laptops) to your PC, XT or AT via the serial port and allows you full access to all the disk drives of both machines for effortless file transfer (at 115K bits per second).... Installation is a snap. It works first time out, no glitches. It's transparent. It's great. And since it's priced at $129.95, it would be silly to buy an add-on drive for your MS-DOS laptop.

"Call the company at (404)454-7911 or write them at White Crane Systems, 6889 Peachtree Industrial Boulevard (Suite 151), Norcross, GA 30092. My highest recommendation."

*Reprinted from PC Magazine February 10, 1987 Copyright 1987 Ziff Communications Company

THE BROOKLYN BRIDGE

WHITE CRANE SYSTEMS

404-454-7911

Suite 151

6889 Peachtree Ind Boulevard

Norcross, Georgia 30092

CIRCLE 309 ON READER SERVICE CARD

```
  END;

  PROCEDURE WriteFINISH;
  BEGIN
    WriteLn(O,'BEGIN');
    WriteLn(O,'  WriteLn(''Checking DATA for errors...'');');
    WriteLn(O,'  FOR L := 8 to ',NumDataLines-1,' DO');
    WriteLn(O,'    BEGIN');
    WriteLn(O,'      LT := 8;');
    WriteLn(O,'      FOR H := 1 to 16 DO LT := LT + data[L*18 + B];');
    WriteLn(O,'      IF LT <> data[L*18+17) + (data(L*18+18) shl 8) THEN');
    WriteLn(O,'        BEGIN');
    WriteLn(O,'          WriteLn(''ERROR in DATA line # '',L+1);');
    WriteLn(O,'          Halt;');
    WriteLn(O,'        END;');
    WriteLn(O,'    END;');
    WriteLn(O,'  Assign(O,''',filename,'.COM''];');
    WriteLn(O,'  ReWrite(O);');
    WriteLn(O,'  FOR L := 8 to 18 DO');
    WriteLn(O,'    FOR H := 1 to 16 DO');
    WriteLn(O,'      Write(O, data[L*18 + H]);');
    WriteLn(O,'  Close(O);');
    WriteLn(O,'  WriteLN(''',filename,'.COM successfully created'');');
    WriteLn(O,'END.');
    WriteLn(filename+'.PAS', ' Written as a TURBO Pascal file.');
  END;

BEGIN
  Initialize;
  WriteMAIN;
  WriteDATA;
  WriteFINISH;
  Close(O);
END.
```

*(Figure 5 ends)*

*bo program that re-creates the .COM file, so I've added the program that is shown in Figure 5. Note that neither BASDATA-.PAS nor PASDATA.PAS is absolutely faithful to the original—the created file will be padded with 00 bytes in order to make its size a multiple of 16.*

**SHARE YOUR TURBO POWER**

Tell the world about your latest Turbo Pascal programming and applications tips through Turbo Power User, and we'll pay you $50 for your trouble, *plus an extra $25 if you submit it on a disk.* If you do send a disk, please include a printout of your submission to ensure against possible damage in transit.

Mail your contributions to Turbo Power User, *PC Magazine*, One Park Avenue, New York, NY 10016. PC

*Neil J. Rubenking is a professional Pascal programmer.*

The best way to increase profits is to take a closer look at the books. And the best way to do that is with Champion III, a best selling business accounting software system that includes:
• General Ledger • Accounts Payable • Payroll • Accounts Receivable • Inventory • Job Cost • Order Entry Free with AR • Point of Sale Free with AP

Champion has helped over 10,000 businesses automate their accounting systems and more than 17 glowing reviews have been published about our products. Our dBase III version is simple to use and offers 24 months "open", more than any other accounting software. Source code available.

Champion is truly interested in your profitability. So, call us today and let us show you how automating with Champion will help increase your profits.

CHAMPION
BUSINESS SYSTEMS, INC.

17301 West Colfax Ave., Suite 250
Golden, Colorado 80401
(303) 278-8666/(800) 243-2626

CIRCLE 275 ON READER SERVICE CARD

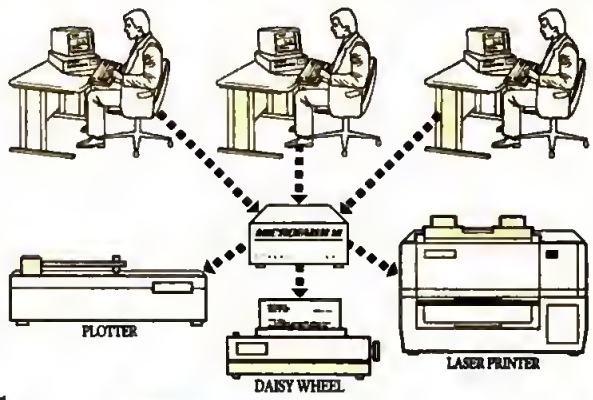
# FOR SOME, SHARING COMES NATURALLY. OTHERS NEED MICROFAZER VI.

### MAKE THE MOST OF YOUR EXPENSIVE RESOURCES WITH MICROFAZER® VI.

When you invest in expensive computer resources, it pays to share them among users. And with Microfazer VI from Quadram, sharing resources is easier than ever.

Microfazer VI connects printers, plotters, daisies, and other peripherals to different computers, giving your users direct access to the equipment they need. Choose from two models: one with 6 serial ports, or one with 4 serial ports and 2 parallel ports. Then set the input/output combination that's right for you: 5-in/1-out, 3-in/3-out, whatever you need.

You configure and control Microfazer VI from its front panel switches. There's no special software to run. That makes for easy "plug-and-play" operations. And it comes with 256K memory (expandable to 1 MB) to buffer even the largest jobs.



### MICROFAZER. THE NUMBER 1 NAME IN PERIPHERAL CONTROLLERS.

Advanced features make Microfazer VI the perfect alternative to many networks. We've included beginning and end of job status messages, a 20-or-200 second no data time out, and the ability to automatically configure printers to specific user needs. No wonder Microfazer is the number 1 name in peripheral controllers!

Make the most of your resources with Microfazer VI, the natural solution to cost-effective sharing for any business. For more information, contact us at One Quad Way, Norcross, Georgia, 30093. (404) 564-5566.

QUADRAM®
An Intelligent Systems Company

MICROFAZER VI. BECAUSE RESOURCES WERE MEANT TO BE SHARED.

CIRCLE 190 ON READER SERVICE CARD

■ PAUL SOMERSON

# USER-TO-USER

*Twin utilities for converting text to upper- or lowercase, speedier graphics, a memory configuration tool, and a warning about print buffers.*

## LIGHTNING-FAST CONVERSIONS

UPPER.COM and LOWER.COM are two programs that will convert any ASCII text file, including *WordStar* document files, to either all uppercase or all lowercase. Use UPPER if you receive an assembly source file, for example, that is in all or partial lowercase, and you prefer to have it in all uppercase.

Similarly, use LOWER if you receive a text file that is all uppercase and you prefer to have it in the conventional lowercase. LOWER will leave the first character of a sentence and the singular character "I" in caps. LOWER is not perfect, however. You'll have to edit the file by returning the initial character in any proper names and any other special case-sensitive words to uppercase, but that's a lot easier that having to edit the entire file.

The respective syntax is

```
UPPER filespec
```

and

```
LOWER filespec
```

To create the files, run the UPPER.BAS program in Figure 1 and the LOWER.BAS program in Figure 2, or use a pure ASCII word processor or the DOS COPY CON command to type in the UPPER.SCR script in Figure 3 and the LOWER.SCR script in Figure 4. Don't type the comments following the semicolons, or the semicolons themselves. Hit the Enter key at the end of each line, especially the last one (with the Q), and be sure to leave a blank line above RCX. Then get into DOS version 2.0 or later, put the UP-

```
100 ' Program for creeting UPPER.COM -- by Micheel Nefford
110 CLS:PRINT "Checking OATA; pleese weit..."
120 FOR B=1 TO 9:FOR C=1 TO 17:READ A$:IF C<17 THEN 140
130 Z=Z+VAL(A$)
140 NEXT:NEXT:IF Z=13857 THEN RESTORE:GOTO 160
150 PRINT "ERROR IN BIG NUMBER AT END OF DATA STATENENT":END
160 FOR B=1 TO 9:FOR C=1 TO 16:READ A$:T=T+VAL("&H"+A$):NEXT
170 READ S:IF S=T THEN 180 ELSE PRINT "ERROR IN LINE";B*10+210:ENO
180 T=0:NEXT:RESTORE:OPEN "UPPER.COM" AS #1 LEN=1:FIELD #1,1 AS D$
190 FOR B=1 TO 9:FOR C=1 TO 16:READ A$
200 LSET O$=CHR$(VAL("&H"+A$)):PUT #1:NEXT:READ DUMMY$:NEXT
210 CLOSE:PRINT "UPPER.COM CREATEO"
220 DATA BB,80,00,02,1F,01,FB,82,00,72,55,C6,47,01,00,BA,1513
230 OATA 02,00,B8,02,3D,CD,21,BA,62,01,72,40,8B,D8,BA,83,1750
240 DATA 01,8B,F2,B9,00,FE,B4,3F,CD,21,BA,71,01,3O,00,FE,1917
250 DATA 74,2A,50,8B,C8,AC,24,7F,3C,61,72,08,3C,7A,77,04,1496
260 DATA 80,64,FF,OF,E2,EF,33,O2,B0,00,42,CD,21,BA,03,01,2230
270 OATA 59,B4,40,CD,21,B4,3E,CD,21,BA,7E,01,B4,09,CD,21,1791
280 DATA CD,20,46,69,6C,65,20,6E,6F,74,20,66,6F,75,6E,64,1562
290 OATA 24,46,69,6C,65,20,74,6F,6F,20,62,69,67,24,44,6F,1343
300 OATA 6E,65,24,00,00,00,00,00,00,00,00,00,00,00,00,247
```

**Figure 1:** *UPPER.BAS program to create UPPER.COM utility that converts text files to all uppercase.*

```
100 ' Program for creeting LOWER.COM -- by Nichael Nefford
110 CLS:PRINT "Checking OATA; please wait..."
120 FOR B=1 TO 12:FOR C=1 TO 17:READ A$:IF C<17 THEN 140
130 Z=Z+VAL(A$)
140 NEXT:NEXT:IF Z=18416 THEN RESTORE:GOTO 160
150 PRINT "ERROR IN BIG NUMBER AT END OF OATA STATEMENT":ENO
160 FOR B=1 TO 12:FOR C=1 TO 16:READ A$:T=T+VAL("&H"+A$):NEXT
170 READ S:IF S=T THEN 180 ELSE PRINT "ERROR IN LINE";B*10+210:ENO
180 T=0:NEXT:RESTORE:OPEN "LOWER.COM" AS #1 LEN=1:FIELD #1,1 AS O$
190 FOR B=1 TO 12:FOR C=1 TO 16:READ A$
200 LSET D$=CHR$(VAL("&H"+A$)):PUT #1:NEXT:READ DUMMY$:NEXT
210 CLOSE:PRINT "LOWER.COM CREATED"
220 DATA BB,80,00,02,1F,01,FB,82,00,73,03,E9,8A,00,C6,47,1616
230 DATA 01,00,BA,02,80,B6,02,3D,CD,21,BA,9B,01,72,75,8B,1514
240 DATA D8,BA,BC,01,8B,F2,B9,00,FE,B4,3F,CD,21,BA,AA,01,2249
250 DATA 3O,00,FE,74,5F,50,8B,C8,AC,24,7F,3C,2E,74,33,3C,1613
260 DATA 3F,74,2F,3C,21,74,2B,3C,41,72,31,3C,5A,77,2O,00,1208
270 DATA 3E,9A,01,01,75,07,C6,06,9A,01,00,EB,1F,3C,49,75,1217
280 DATA 0B,80,3C,20,75,06,80,7C,FE,20,74,10,80,4C,FF,20,1515
290 DATA EB,0A,80,3C,20,75,05,C6,06,9A,01,01,E2,BA,33,D2,1620
300 DATA B8,00,42,CD,21,BA,BC,01,59,B4,40,CD,21,B4,3E,CD,1881
310 DATA 21,BA,B7,01,B4,09,CD,21,CD,20,01,46,69,6C,65,20,1404
320 OATA 6E,6F,74,20,66,6F,75,6E,64,24,46,69,6C,65,20,74,1477
330 DATA 6F,6F,20,62,69,67,24,44,6F,6E,65,24,00,00,00,00,1022
```

**Figure 2** *LOWER.BAS program to create LOWER.COM utility that converts text files to all lowercase but leaves the first character of a sentence and the singular character "I" in caps.*

GenTech

**COMPUTERS**

**LAPTOPS**

| | |
|---|---|
| NEC MULTISPEED | $1559 |
| SHARP 7000A | $1299 |
| SHARP 7100 | $1999 |
| TOSHIBA 1100 PLUS | $1575 |
| 3100 PLUS | $3199 |
| ZENITH 181-92 | $1659 |
| 171-42 | $1399 |

**PORTABLES**

| | |
|---|---|
| COMPAQ PORTABLE DUAL | $1679 |
| PORTABLE II | $CALL |
| PORTABLE III | $CALL |
| PANASONIC | |
| Sr Partner 10MB | $1449 |
| Exec Partner 1 DR | $1399 |

**DESKTOPS**

| | |
|---|---|
| COMPAQ | |
| DESKPRO Mod 2 | $1149 |
| DESKPRO 286 Mod 40 | $3399 |
| DESKPRO 386 Mod 70 | $5699 |
| DESKPRO 386 Mod 130 | $6899 |
| IBM All Models | $CALL |
| NEC Powermate I H202C | $2679 |
| 20MB Multisync Keybd | |
| Powermate II H501C | $3459 |
| 40MB Multisync Keybd | |
| Businessmate | $CALL |
| PANASONIC | |
| FK-600 Bus Partner | $1179 |
| 8086 20MD 256K | |
| FX-800 Bus Partner | $1499 |
| 80286, 1 2MB 512K | |
| SPERRY IT Expanded, 44MB | $2895 |
| WYSE PC1400 – 20MB | $1459 |
| 8086, 640K 20MD | |
| PC2200 – 20MB | $3899 |
| 80286, 640K, 20MB | |
| ZENITH ZF-248-81 | $2099 |
| ZF-248 84 | $2998 |

**PRINTERS**

**LASER PRINTERS**

| | |
|---|---|
| HEWLETT PACKARD | |
| LASERJET II | $1959 |
| OKIDATA Laserline 6 | $1499 |
| OMS XISS | $1750 |
| PS-800 | $4099 |
| QUADLASER | $CALL |

**DOT MAX/LETTER QUALITY**

| | | | |
|---|---|---|---|
| BROTHER | | | |
| HR-20/HR-35 | | | $359/769 |
| M1409/M1509 | | | $329/389 |
| M1709 | | | $499 |
| EPSON | | | |
| FX-85 | $359 | FX-86e | $379 |
| FX-286e | $535 | LX-80 | $229 |
| LQ-800 | $479 | LQ-1000 | $685 |
| EX-800 | $445 | EX-1000 | $565 |
| FUJITSU | | | |
| DX2100/2200 | | | $365/450 |
| DL2400 | | | $819 |
| HECIS | | | |
| P660 | $459 | P760 | $646 |
| P560XL | $969 | P960XL | $CALL |
| 3550 | $779 | CPB/7 | $CALL |
| OKIDATA | | | |
| ML192 + | $350 | ML193 | $535 |
| ML292 | $549 | ML293 | $689 |
| PANASONIC | | | |
| KXP-1000i | $229 | KXP-1091i | $295 |
| KXP-3131 | $289 | KXP-1592 | $469 |
| SILVEREED | | | |
| EXP-420 | $199 | EXP-800 | $699 |

**International inq. welcome**

**FAX #**

**401-732-5518**

**HARD DISKS & TAPE BACKUP**

| | |
|---|---|
| SEAGATE INTERNAL HARD DISKS | |
| ST225 (20MB) W/Ctr | $375 |
| ST238 (30MB) W/Ctr | $429 |
| ST251 (40MD) for AT | $669 |
| ST4096 (80MB) for AT | $969 |
| IOMEGA BERNOULLI | $CALL |
| MAKTOR 1140 (120MB) | $2599 |
| PRIAM 60MB for AT | $969 |
| 130MD for AT | $2299 |
| MINISCRIBE 6065 70MD | $669 |
| MICROPOLIS 60MB | $899 |
| IRWIN TAPE BACKUPS | |
| 10MB int/ext | $349/425 |
| 20MB int/ext | $475/529 |
| 40MB int/ext | $589/649 |
| ARCHIVE 60MB Tape | $669 |
| EVEREX 60MB Tape | $799 |
| PLUS HARDCARD 20 | $649 |
| CMS 20MD DRIVECARD | $399 |
| 30MD DRIVECARD | $499 |

**PLOTTERS & DIGITIZERS**

| | |
|---|---|
| NEWLETT PACKARD | |
| 7440A COLORPRO | $1019 |
| 7475A 6 Pen Plotter | $1479 |
| 7550A 8 Pen Plotter | $3029 |
| 7570A DRAFTPRO | $4339 |
| 7580B Drafting Plotter | $6399 |
| CALCOMP | $CALL |
| GTCO DIGITIZERS | |
| M07-1212 | $479 |
| DP5-2436L | $2399 |
| DP5-3648 | $2999 |

| | | | |
|---|---|---|---|
| HOUSTON INSTRUMENTS | | | |
| DMP 41/42 | | | $2499 |
| DMP-51/52 | | | $3589 |
| DMP-51/52MP | | | $4039 |
| DMP-56A/56MP | | | $4495/5349 |
| DMP-29 | | | $1750 |
| HITACHI | | | |
| HDG-0812 | | | $559 |
| HDG-1111C | | | $499 |
| HDG-1217 | 12X17 | | $1039 |
| HDG-1515B | | | $1199 |
| IOLINE PLOTTER | | | |
| LP3700 | | | $3399 |
| LP3700MP | | | $3819 |
| KURTA ONE 200PPI | | | $609 |
| SUMMAGRAPHICS | | | |
| SUMMASKETCH | 12X12 | | $429 |
| MM1012 | 12X18 | | $699 |
| ROLAND | | | |
| DXY-660/980 | | | $999/1259 |
| DXY-885/990 | | | $1309/1739 |

**MONITORS & TERMINALS**

| | | |
|---|---|---|
| AMDEK 310A/ 410 | | $159/189 |
| MITSUBISHI | | |
| 1409C | CGA | $319 |
| 1410C | EGA | $436 |
| 19" Models | | $CALL |
| NEC MULTISYNC | | $585 |
| PGS MAX 12/ HK-12E | | $175/509 |
| SAMSUNG OR TORCH | | |
| GREEN/AMBER TTL | | $99 |
| SONY | | |
| CP-1302 MULTISCAN | | $D49 |
| KV-1311CB | | $459 |
| WYSE | | |
| WY-30/50 | | $299/429 |
| WY-85 | | $489 |
| WY-530 | | $179 |
| WY-700 | | $749 |

**NETWORKING**

| | |
|---|---|
| NOVELL | |
| ARCNET 86 Starter Kit | $1789 |
| ARCNET 286 Starter Kit | $2499 |
| CORVUS 8 User Starter | $949 |
| ETHERNET 286 Starter | $3519 |

**SOFTWARE**

| | |
|---|---|
| ASHTON-TATE DBase III + | $409 |
| FRAMEWORX II | $409 |
| COPY II PC | $29 |
| MICROPRO Wordstar Propak | $239 |
| Wordstar 2000 | $259 |
| MULTIMATE | $229 |
| SSI Wordperfect 4 1 | $225 |
| PFS Professional Series | $CALL |

**GENTECH STANDARD**

| | |
|---|---|
| GENTECH 386 | |
| 80836, 16 MHZ, 1 MB RAM, 1.2MB DR | $2999 |
| GENTECH | |
| 80286, 10 MHZ, 1MB RAM, 1 2MB | $999 |
| GENTECH TURBO | |
| 8088, 640K, 1 DR... | $495 |

**FIRMWARE**

| | |
|---|---|
| AST Six Pack Plus | $159 |
| ARTIST | |
| TRANSFORMER TTL | $899 |
| Artist 10/10 | $2030 |
| DCA Irma | $729 |
| EVEREX | |
| Evercom 1200/2400 | $109/209 |

| | |
|---|---|
| HAYES 1200/1200B | $CALL |
| HERCULES | |
| Graphics Plus | $189 |
| Color Card | $159 |
| INTEL Above Board | $CALL |
| NSI | |
| EPIC EGA | $245 |
| SMART EGA | $289 |
| ORCHID TURBO EGA | $629 |
| PARADISE | |
| AUTOSWITCH 350/480 | $CALL |
| QUADRAM | |
| Microlazer II | $289 |
| QUADEGA | $CALL |
| TECMAR EGA MASTER | $289 |
| VERTICOM | |
| H-16E/M-16 | $2289/1139 |
| U.S. ROBOTICS | |
| 1200/2400 Direct | $109/199 |
| ATO ZUCKER | |
| Memory Board | $79 |
| Color Card | $99 |

| MEMORY UPGRADES | 1-9 | 10+ |
|---|---|---|
| 64K Set | $10 | $9 |
| 128K Set | $46 | $45 |
| 256K Set | $30 | $28 |
| 8087-3 | $116 | $109 |
| 8087-2 | $159 | $149 |
| 80287 | $189 | $179 |

**ACCESSORIES**

**SURGE PROTECTORS**

| | |
|---|---|
| ONGUARD 8 outlet | $22 |
| CURTIS Diamond/Ruby | $33/57 |
| NETWORK Wiretree/Plus | $39/55 |
| KENSINGTON Masterpiece | $95 |
| COMPUTER ACCESSORIES | $CALL |
| DATASHIELD 585/5100 | $59/69 |

**EMERGENCY POWER SYSTEMS**

| | |
|---|---|
| DATASHIELD TURBO 350 | $508 |
| SOLA Mini SPS-400 | $595 |
| TRIPPELITE BC-450-FC | $419 |
| 2-Way/3-Way Switchbox | $49/60 |

| DISKS | 5.5" DSDD | 5.25" DSDD | 8"SND |
|---|---|---|---|
| 3M | $29 00 | $13 00 | $29 00 |
| MAXELL | 25 00 | 11 00 | 25 00 |
| GOLDSTAR | 16 00 | 9 00 | 17 00 |
| SKC | 16 00 | 6 00 | 17 00 |
| BULK | | 0 65 | |
| DC1000 | 17 00 | | |
| DC2000 | 27 00 | | |
| DC600A | 29 00 | | |

**CUSTOMER SERVICE**

**401-732-5556**

**ORDERS ONLY**

**800-843-4302**

**217 Broadway, Suite 615, NY, NY 10007**

**VISA, MC** Accepted COD add 2% Corporate PO add 3%, Minimum PO $500 Prices subject to change Return authorization required for defective merchandise All returned non-defective merchandise subject to 20% restocking charge

CIRCLE 266 ON READER SERVICE CARD


## ■ USER-TO-USER

PER.SCR and LOWER.SCR script files in the same directory as DEBUG.COM, and type

```
DEBUG < UPPER.SCR
```

and

```
DEBUG < LOWER.SCR
```

Michael J. Mefford
Gleneden Beach, Oregon

*What's especially good about these two sorely needed utilities is that they convert even long files (and* WordStar *files) extremely quickly and have some real intelli-*

```
N       UPPER.COM
A
MOV     BX,80     ;Argument length ie at 80h
ADD     BL,[BX]   ;Point to end of argumeot
CMP     BX,82     ;Ie there an argument?
JB      160               ;If yee, terminate
MOV     BYTE PTR [BX+1],0  ;Convert to ASCIIz
MOV     DX,82             ;Point to filespec
MOV     AH,3D02   ;Opee the file
INT     21        ; for reading and writing
MOV     DX,162    ;Point to "File not found"
JB      15C       ;Diepley if file not opened
MOV     BX,AX     ;Elee, put filehendle ie BX
MOV     DX,183    ;Point to buffer
MOV     SI,DX     ;Initialiee pointer
MOV     CX,FE80   ;And reed up to 65024 bytee
MOV     AH,3F     ;A bigger file
INT     21        ; will write over the etack
MOV     DX,171    ;Point to "File too big"
CMP     AX,FE80   ;If file => 65024 bytee
JB      15C       ;Diepley meeeage end eeit
PUSH    AX        ;Elee, eave file eiee
MOV     CX,AX     ;File length in counter
LODSB             ;Get e byte
AND     AL,7F     ;Strip high bit
CMP     AL,61     ;Ie it below "e"?
JB      144       ;If yee, ekip
CMP     AL,7A     ;Ie it above "e"?
JA      144               ;If yee, ekip
AND     BYTE PTR [SI-1],DF  ;Elee, capitelise
LOOP    135               ;Get neet byta
XOR     DX,DX     ;Move pointer to etart
MOV     AH,4200   ; of file
INT     21
MOV     DX,183    ;Point to etert of buffer
POP     CX        ;Recover length of file
MOV     AH,40     ; end write to disk
INT     21
MOV     AH,3X     ;Close the file
INT     21
MOV     DX,178    ;Point to "Done" meeeage
MOV     AH,8
INT     21
INT     20                ;Terminate
DB      'File oot found$'
DB      'File too big$'
DB      'Done$'

RCX
83
W
Q
```

**Figure 3:** *UPPER.SCR script to create UPPER.COM file converter that canverts text files (even those created by* WordStar*) inta all uppercase. Use a pure ASCII ward processor or the DOS COPY CON command ta type this in, then get into DOS, put UPPER.SCR in the same directory as DEBUG.COM, and type DEBUG < UPPER.SCR. Dan't type the comments follawing the semicalons. Hit the Enter key at the end af each line, especially the last ane (with the Q), and be sure ta leave a blank line above RCX.*

## ■ USER-TO-USER

```
N       LOWER.COB
A
MOV     BX,80           ;Argument length is at 80h
ADD     BL,[BX]         ;Point to end of argument
CMP     BX,82           ;Is there an argument?
JNB     10E             ;If no, continue
JMP     19B                     ;Else, terminate
MOV     BYTE PTR [BX+1],0       ;Convert to ASCIIZ
MOV     DX,82                   ;Point to filespec
MOV     AX,3D02         ;Open the file
INT     21              ; for reading and writing
MOV     DX,19B          ;Point to "File not found"
JB      194             ;Display if file not opened
MOV     BX,AX           ;Else, put filehandle in BX
MOV     DX,1BC          ;Point to buffer
MOV     SI,DX           ;Initialize pointer
MOV     CX,FE00         ;And read up to 65024 bytes
MOV     AH,3F           ;A bigger file
INT     21              ; will write over the stack
MOV     DX,1AA          ;Point to "File too big"
CMP     AH,FE00         ;If file => 65024 bytes
JZ      184             ;Display message and exit
PUSH    AX              ;Else, save file size
MOV     CX,AH           ;File length is counter
LODSB                   ;Get a byte
AND     AL,7F           ;Strip high bit
CMP     AL,2E           ;Is it a period
JZ      172             ;If yes, possible sentence
CMP     AL,3F           ;Is it a question mark
JZ      172             ;If yes, possible sentence
CMP     AL,21           ;Is it exclamation point
JZ      172             ;If yes, possible sentence
CMP     AL,41           ;Is it below "A"?
JB      17C             ;If yes, next byte
CMP     AL,5A           ;Is it above "Z"?
JA      17C                     ;If yes, next byte
CMP     BYTE PTR [10A],1        ;Sentence flag?
JNZ     15D             ;If no, check "I"
MOV     BYTE PTR [10A],0        ;Else, reset flag
JMP     17C                     ;Get next byte
CMP     AL,49                   ;Is it "I"?
JNZ     14C                     ;If no, lower case
CMP     BYTE PTR [SI],20        ;Next is space?
JNZ     14C                     ;If no, lower case
CMP     BYTE PTR [SI-2],20      ;Other side space?
JZ      17C                     ;If yes, next byte
OR      BYTE PTR [BX-1],20      ;Else, lower case
JMP     17C                     ;Jump to next byte
CMP     BYTE PTR [BX],20        ;Sentence if space
JNZ     17C                     ;If no, not sent.
MOV     BYTE PTR [10A],1        ;Else, flag sent.
LOOP    138                     ;Get next byte
XOR     DX,DX           ;Move pointer to start
MOV     AH,42           ; of file
INT     21
MOV     DX,1BC          ;Point to start of buffer
POP     CX              ;Recover length of file
MOV     AH,40           ; and write to disk
INT     21
MOV     AH,3E           ;Close the file
INT     21
MOV     DX,1B7          ;Point to "Done" message
MOV     AH,9
INT     21
INT     20                      ;Terminate
DB      1
DB      'File not found$'
DB      'File too big$'
DB      'Done$'

RCX
RC
W
Q
```

**Figure 4:** *LOWER.SCR script to create LOWER.COM file converter that converts text files (even those created by* WordStar*) into all lowercase, but leaves the first character of a sentence and the singular character "I" in caps. Use a pure ASCII word processor or the DOS COPY CON command to type this in, then get into DOS, put LOWER.SCR in the same directory as DEBUG.COM, and type in DEBUG < LOWER.SCR. Don't type the comments following the semicolons. Hit the Enter key at the end of each line, especially the last one (with the Q), and be sure to leave a blank line above RCX.*

*gence built into them. Anyone working with program listings or files that have been downloaded from bulletin boards will wonder how he ever managed to get along without these gems.*

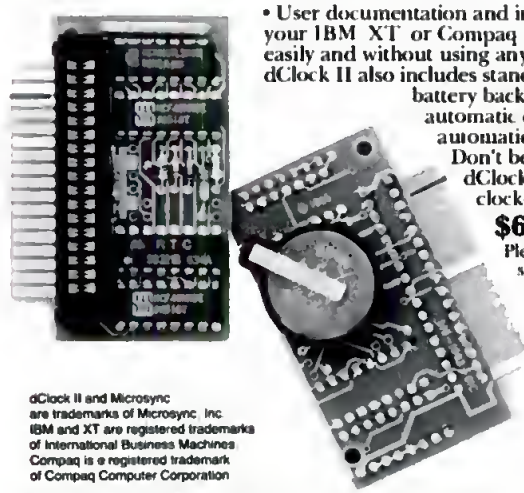

dClock II™

Slotless Clock-Calendar for Personal Computers

ORIGINAL

Never enter date and time into your personal computer again. dClock II, the original slotless, real-time clock-calendar, automatically does it for you when you turn your computer on. dClock II does not take up a valuable expansion slot in your computer. It plugs into the back of your floppy disk drive, and can be installed in less than 5 minutes.

With dClock II you get:
- Compatibility with most all personal computers, including PC, XT®, AT, turbo types, and even non-IBM® compatible.
- Software on a diskette for easy installation.
- 30-day money-back guarantee, 1 year limited warranty.



- User documentation and instructions for upgrading your IBM XT or Compaq Portable® memory to 640K easily and without using any expansion slots.

dClock II also includes standard, replaceable, lithium battery backup, 100 year calendar, automatic end-of-month recognition, automatic leap year compensation. Don't be misled by imitators. dClock II is the **original** slotless clock-calendar.

**$69.95**

Please add $2.00 for shipping and handling

To purchase your dClock II, ask your computer dealer or call:

**(214) 788-5198**

dClock II and Microsync are trademarks of Microsync, Inc. IBM and XT are registered trademarks of International Business Machines. Compaq is a registered trademark of Compaq Computer Corporation

MICRO Sync

P.O. Box 116302 • Carrollton, Texas 75011 • Dealer inquiries welcome

CIRCLE 143 DN READER SERVICE CARD

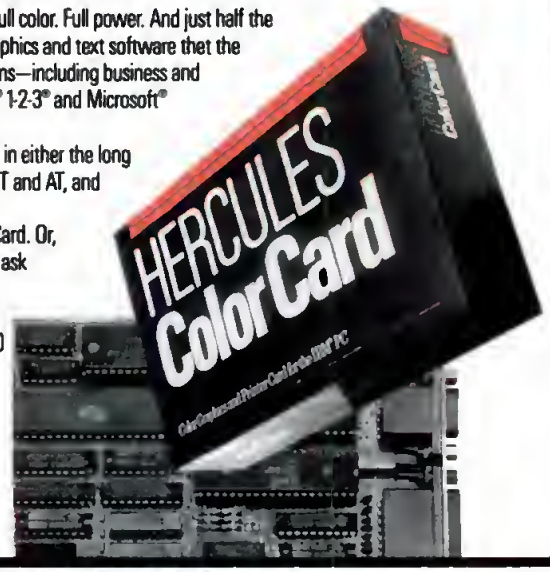
Full color. Half size.

The Hercules® Color Card. Full color. Full power. And just half the size. Yet, it runs all the same graphics and text software that the IBM® Color Graphics Adapter runs—including business and recreational software like Lotus® 1-2-3® and Microsoft® Flight Simulator.

The Hercules Color Card fits in either the long or short slots of your IBM PC, XT and AT, and in most compatibles.

Ask for the Hercules Color Card. Or, if you don't need a parallel port, ask for the Hercules Color Card/NP.

For the name of the dealer nearest you call 1-800-532-0600 Ext. 804 (in Canada 1-800-323-0601 Ext. 804)




Hercules Computer Technology
2550 Ninth Street
Berkeley, California 94710
Ph. (415) 540-6000 Telex. 754063

Trademarks/Owners: IBM/IBM Lotus, 1-2-3/Lotus Microsoft/Microsoft, Hercules/Hercules

CIRCLE 390 DN READER SERVICE CARD

## ■ USER-TO-USER

### FAR FASTER GRAPHICS

I read with interest Jack Grasham's suggestion on a Faster Slide Show (Volume 5 Number 21). It's easy to carry this a step further and create "split-screen" slide shows.

Because the technique uses the BASIC PUT and GET commands to store and retrieve information, it is not necessary to store entire screens or locate images in the same place on the screen every time you display them.

It's even possible to reuse the same array to display a partial screen graphic. I've adapted Mr. Grasham's technique to illustrate this fast partial screen display in PARTLOAD.BAS (see Figure 5).

Terry Stewart
Waterloo, Ontario
Canada

*While Mr. Grasham's method was quick, this is even faster, since it moves little pieces of the screen rather than entire screens. While it's true that the PC processes graphic images relatively slowly, techniques like this can add impressive zing to your programs.*

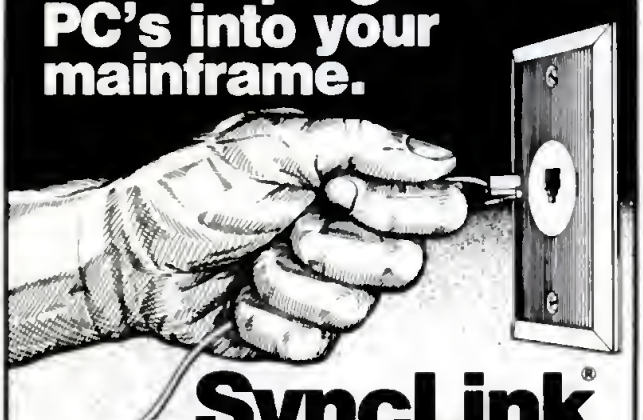
### MEMORY EATER

When programs have overlay structures, it can be difficult to know what the minimum memory requirement is. The following EAT.SCR script will create a two-instruc-

```
100 ' PARTLOAD.BAS  -- Terry Stewart -- COLOR only
110 ' Adapted from DEMOLOAD.BAS -- Jack Graaham
120 SCREEN 0:WIDTH 80:CLS:KEY OFF:DEFINT A-Z:DIM A(3087)
130 PRINT "Firat we'll make 3 partial acreens...";
140 PRINT " (Hit any key)":WHILE INKEY$="":WEND
150 CLS:SCREEN 1:FOR B=1 TO 3:FOR C=1 TO 23
160 PRINT STRING$(40,44+B);:NEXT
170 CIRCLE (160,92),60,4-B,,,4/5:PAINT (160,92),4-B
180 LINE (60,30)-(260,150),B,B
190 GET (60,30)-(260,150),A:DEF SEG:ADDRESS=VARPTR(A(0))
200 BSAVE "SCR"+MID$(STR$(B),2),ADDRESS,6144:CLS
210 NEXT:PRINT "Now we'll load them...  (Hit any key)"
220 WHILE INKEY$="":WEND:CLS:FOR C=1 TO 23
230 PRINT STRING$(40,61);:NEXT:ADDRESS=VARPTR(A(0))
240 BLOAD "SCR1",ADDRESS:PUT (0,0),A,PSET
250 BLOAD "SCR2",ADDRESS:PUT (58,31),A,PSET
260 BLOAD "SCR3",ADDRESS:PUT (117,62),A,PSET:LOCATE 1,1
```

**Figure 5**: *PARTLOAD.BAS program that flashes graphics windows onto the screen. For color systems only.*


How to plug remote PC's into your mainframe.



SyncLink®

synchronous modems bring your PC's as close to your mainframe as the nearest telephone outlet. Just install the SyncLink modem card in your IBM PC, PC-XT, PC-AT, or compatible, plug the cable into an outlet, and communicate! Available in Bell-compatible 201C (2400 bps) and 208 A/B (4800 bps) versions with auto-dial, auto-answer capability and built-in diagnostics. SyncLink modems are fully supported by our powerful MicroGate® 2780/3780/3270 BSC and 3270 SNA communications software. And prices begin at only $995.00 for a complete package that includes both modem and software.

**Call or write for more information.**

gateway microsystems
INCORPORATED
9501 CAPITAL OF TEXAS HIGHWAY • SUITE 105 • AUSTIN, TEXAS 78759 • (512) 345-7791

CIRCLE 117 ON READER SERVICE CARD



CUSTOM DESIGNED REPRINTS

When your product or company is covered by this magazine, you can order custom designed reprints* for use in promotional mailings, sales kits, press releases and point-of-purchase displays.

For more information on how you can take advantage of this wonderful promotional opportunity, call or write:
Jennifer Locke— Reprints Manager,
Ziff-Davis Publishing Company,
One Park Avenue, New York, NY 10016
212-503-5447.

*Minimum quantity—500 reprints

# Meet your new fax machine.

MicroFax™ puts the power of a full-featured digital fax into your PC or compatible, for about half the cost of a standard fax machine. Send documents to or from any Group III facsimile machine in the world. Your favorite wordprocessing or graphics program, a screen display, or an image scanner can be the source for fax documents.

Meanwhile, you can still use your PC for other activities because MicroFax sends and receives information in the background. Plus, powerful software lets you select the document, destination and time of delivery for your PC-facsimile communications. Send documents to single or multiple destinations while MicroFax maintains complete activity records.

MicroFax can also include a Hayes® compatible 1200 bps modem for PC to PC ASCII communications.

Let a single MicroFax board expand your power to communicate by putting a fax machine inside your computer.

Add desktop publishing and OCR capability with Datacopy's full line of image scanners and software.

***Questions? Call the hotline now! 800-821-2898. In California, call 415-965-7900.***

**DATACOPY**
The Eye of the Computer™

1215 Terra Bella Avenue
Mountain View, CA 94043 fax: 415-965-3474

**CIRCLE 146 ON READER SERVICE CARD**

## Which System Is Exactly Right For You?

# COME TO THE EXPERTS!

## Technoland PC/XT™

(Monitor Optional)

30 Days Money Back Guarantee

Includes 8088-2 Dual Speed unit, 640K RAM, 360K Floppy Drive W/Controller, AT™ Style Keyboard, 135W Power Supply, MS-DOS 3.1 W/Manual, System Manual, Full 18 Months Warranty, Run all major software for IBM-PC™ and PC/XT™.

| | |
|---|---|
| 6.6 MHZ..... | $ 509 |
| 8 MHZ..... | $ 575 |
| 10 MHZ..... | $ 795 |

## Technoland AT™

Includes 80286-Based unit, AMI BIOS, 512K on Board, 1.2 MB Floppy Drive, W.D. Hard/Floppy Controller, Clock/Calendar W/Battery Back Up, AT Style Keyboard, 200-W Power Supply, MS DOS 3.1 W/Manual, System Manuals, Full 18 Months Warranty, Run all major software for IBM-PC/AT™.

| | |
|---|---|
| 6 MHZ..... | $ 869 |
| 8 MHZ..... | $1,059 |
| 12 MHZ..... | $1,649 |

### Monochrome Package:

IBM Brother Green or Amber Monochroma Monitor With Mono-Graphic Card. $ 8[illegible]

### RGB Package:

RGB Color Monitor (640 x 200) With Color Graphic Adaptor. $390

### EGA Package:

EGA Hi-Res. Monitor (640 x 350) With EGA Half Card. $685.00

**XT Multifunction Card** $ 95
- Clock/Calendar, FDC
- Parallel, Serial and Game Ports
- RAM Disk & Printer Spooler (Software)

**Mini I/O Card** $ 55
- Parallel, Serial and Game Ports

**Mono-Graphics Adapter W/Printer Port** $ 89

**Color Graphics Adapter** $ 79

**EGA Card-Short Card** $249
- EGA, CGA, MDA & Harcules compatible
- 256K Memory

**Everex Modem** $129
- 300 & 1200 BPS Short Card
- Fully Hayes Compatible

**Monochrome Monitor** $119
- IBM Look alike
- 12" Screen Amber or Green
- Swivel Base

**Enhanced Keyboard (5339)** $79
- Separate Cursor & Numeric Pads
- LED Status Indicators
- 12 Function Keys

**135W Power Supply** $ 79

**200W Power Supply** $119

**RGB Color Monitor** $329
- 13" Screen
- 640 x 200 Resolution
- RGB — 16 Color

**EGA Color Monitor** $449
- 31 mm Dot Pitch
- 13" Screen
- 640 x 350 Resolution
- RGB 16 — Color

**Seagate Hard Disk: Hard Disk Kit** $379
- 20 MB Half Ht. ST225 W/Controller
- 65 MS Access Time

**30 MB ST4038** $529

**40 MB ST4051** $759
- 39 MS Access Time
- Auto Head Parking
- Linear Voice Coil Activator

**360K Floppy Disk Drive** $ 90

**1.2MB Floppy Disk Drive** $125

**Tandon Hard Disk Card-20MB** $408

**Citizen Parallel Printer**

**MSP — 20 (80 Column)** $329

**MSP — 25 (136 Column)** $489
- 200 CPS Draft / 50 CPS NLQ
- 8 K Buffer
- Graphic Capability
- IBM Epson Compatible

**Call for More Selection**

### Order Toll Free:
## (800) 222-3978

In California: (213) 724-2781
Technical Support: (213) 724-1684
Customer Service: (213) 724-1685

Mon. — Sat. 8:00 a.m. to 5:00 p.m.

IBM, Hercules, Compaq, ATT, Panasonic, TEAC, Mitsubishi, ARC, Sanyo, Western Digital and Seagate are trademarks of their respective companies. MS-DOS is a trademark of Microsoft Corporation. IBM PC, IBM XT and IBM AT are trademarks of IBM Corporation.

**Quantity Discount Available!**

# Technoland™

**Los Angeles Demo Center:**
5830 E. Washington Blvd.
City of Commerce, CA 90040
Tel: (213) 724-2781

**San Jose Demo Center:**
2970 Gordon Ave.
Santa Clara, CA 95050
Tel: (408) 732-2244

**5 Days Guaranteed Shipping**
**Next Day Delivery Available**
**Free UPS (G) Shipping**

All prices are subject to change without notice.
We accept Master Card & VISA (no surcharge), Cashier Check, Personal Check (15 days to clear), and approved purchase order from Universities, Institutions & Fortune 500 company.
Any item bought from Technoland (including software if unopened) may be returned for a full refund (except freight) within 30 days of the date it was shipped if for any reason you are not 100% satisfied. All Technoland products carry Technoland's one year limited warranty. Some products also carry manufacturer's warranty. Selected Technoland products may carry additional warranties. Warranty and refund policy requires that you submit the invoice and obtain an RMA number from us by phone.

CIRCLE 322 ON READER SERVICE CARD

## ■ USER-TO-USER

tion program that lets you eat up memory gradually so you can test how the program will run on a smaller machine.

```
A
MOV DX,3FB0
INT 27

RCX
5
N EAT16K.COM
W
Q
```

Type this in using a pure ASCII word processor or the DOS COPY CON command. Leave a blank space before RCX, and be sure to hit the Enter key after each line, espcially the last one (with the Q). Then get into DOS and type

```
DEBUG < EAT.SCR
```

Each time you run this program it will eat 16K. You can vary the number of bytes (bite size) in the MOV instruction from FFB0 (64K) to 0020 (112 bytes). These amounts are for DOS 3.1.

Richard Kleinschmidt
Manchester, New Hampshire

*We thought we had seen every last terminate-but-stay-resident (TSR) program until this one arrived.*

WordStar's *old installation program couldn't handle systems with 640K of RAM. If you wanted, you could run the 64K version of this program twice to eat up 128K and bring the RAM down to the 512K level WINSTALL.COM could work with. Or you could just as easily patch WINSTALL (by replacing the 7C value at address 2D4 with 72), or set up a 128K RAMdisk.*

### SECURITY BUFFER

Previous User-to-User columns have pointed out that if you're really interested in security you have to make sure that in addition to eradicating your sensitive files you also look for "hidden" .BAK backup or .$$$ temp files that your software may have created and wipe those out as well.

But I've found another potential threat to data security—your print buffer. Many print buffers offer an option to reprint a file multiple times. This option could also allow someone to print out copies of your buffered files after you've finished printing and left your system unattended.

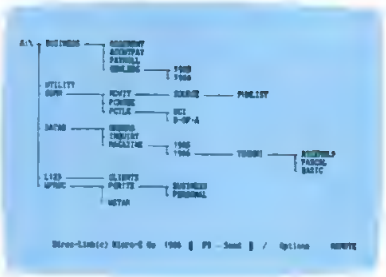
If you must print confidential files, make sure you clear the print buffer. External buffers generally have reset switches, or you can turn them off. Simply clearing an internal memory buffer might not actually remove data from your system, and someone could fish it out using DEBUG.

Even rebooting does not always clear


DIREC-LINK

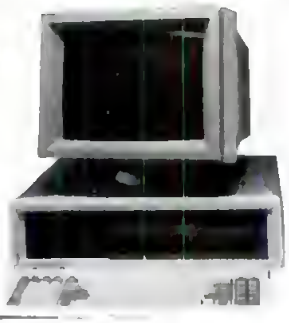
Now there is a software solution that handles copying files between your PC and Lap-Top – **SIMPLY.** No clumsy setups, no long strings of commands, no modems, no external drives to buy. Just connect the serial ports, run Direc-Link on both machines, select the files to be copied, and go!

First, Direc-Link displays a complete tree diagram of the directories of each PC. Point to a directory and tag the files you want to send, then select where you want to send them – hard disk or floppy. You can tag any number of files from a directory – using a variety of tagging commands. The received files are faithful **COPIES,** including the original creation date and time, without the extra characters some modem programs add!



Your **FILES** are copied fast, over 10,000 characters per/sec (115,200 baud), and you can control the whole process from either keyboard. Direc-Link requires a minimum of keystrokes – simply point and shoot. If you have files that you send back and forth regularly, you can store the entire sequence in command files that execute with a single keystroke. The program comes with both 3½" and 5¼" disks so you can install Direc-Link on your PC, your laptop, your portable, or any PC compatible.

Now you're ready to copy any number of files **BETWEEN PC's** and lap-tops! You can customize Direc-Link for color or monochrome displays, and change the communications parameters. Cable wiring diagrams are included and you can order cables directly from us.
Only $59.50 plus $5.00 shipping.
California residents add sales tax.



MICRO-Z

NOT COPY PROTECTED!
To order call 213-377-1640
Company (est. 1967)
4 Santa Bella Road, Rolling Hills Estates, CA 90274

VISA
Dealer Inquiries Invited

System Requirements: IBM PC, XT, AT, or compatible, serial port, DOS 2.0 or later and 80 column display. Requires less than 64K RAM

CIRCLE 113 ON READER SERVICE CARD

NEW

# MINI-286 12 MHz AVAILABLE!

# CPU MINI 286™

## AT® COMPATIBLE

- 80286 CPU (HARDWARE SWITCHABLE SPEED)
- PHOENIX BIOS - THE STANDARD OF COMPATIBILITY
- PHOENIX SET UP SOFTWARE INCLUDED
- 512K RAM ON BOARD (EXPANDABLE TO 1024K).
- CLOCK/CALENDAR W/BATTERY BACKUP
- 12MB FLOPPY DISK DRIVE
- W.D. FLOPPY/HARD DRIVE CONTROLLER
- NEW ENHANCED KEYBOARD (101 KEYS W/SEPARATE NUMERIC AND CURSOR PADS)
- 200W SWITCHING POWER SUPPLY
- HARDWARE RESET BUTTON
- POWER AND HARD DISK INDICATION LEDS
- LOCKABLE CASE ALSO SERVES AS KEYBOARD LOCK-OUT
- 20% OVERALL SIZE REDUCTION COMPARED TO IBM PC/AT

6/8 MHz
**$ 995**

8/10 MHz
**$1,095**

**ALL ITEMS FULL ONE YEAR WARRANTY PARTS AND LABOR**

# CPU TURBO™

**IBM PC/XT COMPATIBLE**
**RUNS 3 TIMES FASTER THEN IBM PC/XT**
**(AS REPORTED BY NORTON UTILITIES)**

## BASIC SYSTEM

- NEC V-20 DUAL SPEED CPU OPERATING AT 4.77/8.0 MHz
- PHOENIX BIOS - THE STANDARD OF COMPATIBILITY
- 640K ON BOARD MEMORY WITH 0-WAIT STATE OPERATION
- OPERATING SPEED CONTROLABLE BY KEYBOARD, SOFTWARE AND HARDWARE WITHOUT POWER DOWN
- 8 EXPANSION SLOTS
- 2 360K HALF HEIGHT FLOPPY DRIVES
- 4 LAYER MOTHERBOARD
- SOCKET FOR OPTIONAL 8087-2 MATH CORPROCESSOR
- LOCKABLE CASE
- AT STYLE KEYBOARD
- 135W SWITCHING POWER SUPPLY
- PARALLEL PORT, SERIAL PORT (2ND SERIAL PORT OPTIONAL) GAME PORT AND CLOCK CALENDAR W/BATTERY BACKUP
- TURBO MODE AND POWER LEDS
- FULLY IBM PC/XT COMPATIBLE

NEW LOW PRICE
**$745**

**ORDERS ONLY CALL TOLL FREE 1/800-662-6111 · 1/800-824-2936**
INSIDE CALIFORNIA OUTSIDE CALIFORNIA

Computer Products United

1260 E. Colorado Blvd.
Pasadena, CA 91106
Information Call
(818) 796-8684

TERMS: We accept Cashier's Checks, Visa, Mastercard. Personal checks take 15 days to clear. Call for return authorization number on all warranty repairs. Any unauthorized return subject to a 10% restocking fee.

© 1986 Computer Products United-All Rights Reserved
• IBM is a registered trademark of International Business

CIRCLE 163 ON READER SERVICE CARD

## ■ USER-TO-USER

internal buffers, if the buffer is high enough in memory. To be sure a buffer is completely erased, turn the main power off and then on again.

Ronny Richardson
Chamblee, Georgia

*Many users are sloppy about security. If they really have to expunge sensitive files, they should use a utility like Norton's to find all the "erased" files and write over them. As just about everyone is aware, using the DOS DEL or ERASE commands leaves the files intact; Norton's* Wipefile *or* PC Magazine*'s DELZ fixes this.*

■ If you're nervous about security, encrypt files, lock things up, and don't leave your system on.

*You could, of course, run a small BASIC program such as WIPEOUT.BAS:*

```
100 'WIPEOUT.BAS -- writes Xs and erases
110 INPUT "Enter filename: ",F$
120 INPUT "Enter file length: ",S
130 OPEN F$ FOR OUTPUT AS #1
140 FOR A=1 TO S:PRINT #1,CHR$(88);:NEXT
150 CLOSE:KILL F$:PRINT F$;" DELETED"
```

*Another source of trouble is ASCII configuration files for communications programs, with passwords in plain text. And you can often see what file or program a previous user was working on by hitting the F3 key. If you're nervous about security, encrypt files, lock things up, and don't leave your system on, unless you've installed a program like* PC Magazine*'s Freeze, which locks the system up until the proper password is entered.*

### SHARE YOUR DISCOVERIES

Tell fellow users about your latest discovery through User-to-User, and we'll pay you between $50 and $300 if published, *plus an extra $25 if you submit it on a disk.* If you send a disk, please include a printout to ensure against damage in transit. Mail your contributions to User-to-User, *PC Magazine*, One Park Avenue, New York, NY 10016.


COPY II® PC OPTION BOARD

**AN ALMOST FOOLPROOF WAY TO MAKE ARCHIVAL BACKUPS OF PROTECTED SOFTWARE!**

The Copy II PC Option Board is an easy-to-use add-in board that will give your PC the same disk duplication technology used by most disk duplication firms (who put the copy protection on software in the first place).

**DUPLICATES NEARLY ALL PROTECTED DISKETTES.**

The Option Board can easily backup almost all protected diskettes for the IBM PC, including ones software-only backup programs can't touch. It even includes a track editor that will allow the more technically inclined to look at protection schemes and edit any data on a diskette.

The Option Board uses a half-size slot in an IBM PC, XT or AT (with at least 1 360KB floppy disk drive), Heath/Zenith 150, 151, 158, Compaq Deskpro. Extra $15 cable required for Compaq Portable, HP Vectra and Tandy 1000. Tandy 1000 requires 256K of memory.

**Call 503/244-5782,** M—F, 8—5 (West Coast time) with your [redacted] in hand. Or send a check for $95.00 U.S. plus $3 s/h, $15 overseas. Please specify your computer brand when ordering so we can send you the correct cable.

**$95.00**

Central Point Software, Inc.
9700 S.W. Capitol Hwy., #100
Portland, OR 97219

Central Point Software INCORPORATED

*Backup utilities also available for the Macintosh, Apple II, Commodore 64/128 and Atari ST.*

CIRCLE 156 ON READER SERVICE CARD

Custom forms. Easy.

Isn't it frustrating? You need all kinds of forms to run your business, but your word processor can't draw lines and your graphics software won't type. Now **FormWorx™** lets you create top-quality business forms right on your PC — or modify existing ones quickly and easily as your needs change. FormWorx is fast, neat and flexible.

**Design forms easily.** You can use solid, double, bold, or dotted lines. And choose from a variety of graphic symbols and type sizes (including compressed type on most printers) using simple commands and pop-down menus. Pick from dozens of possible form sizes including 11" x 14".

**Fill out forms perfectly.** You can fill out custom or even pre-printed forms on your PC without accidentally crossing a line, using text editing features like on-screen underlining, boldfacing, justification and automatic word wrap. Integrated macros let you automate repetitive tasks, type "boiler plate" phrases with a single keystroke, jump from one blank to another, and more.

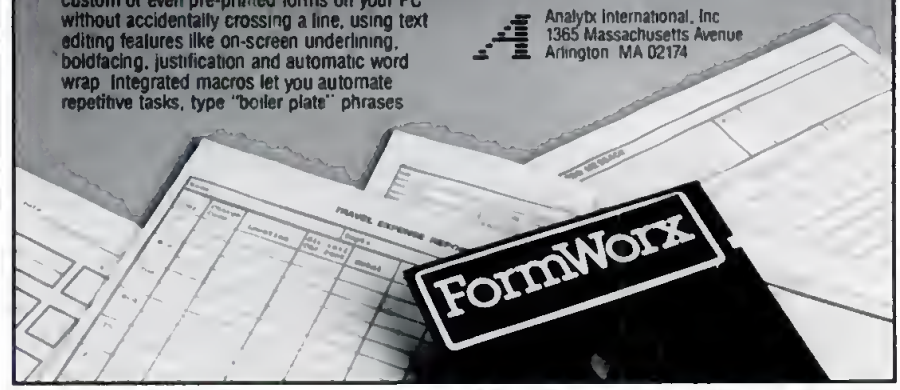
**Print the whole form or just the data.** On any of 100 printers including the HP LaserJet.

**Special offer!** For just $95* you get the complete FormWorx system including sample forms and superb manual with tutorials. Plus *free* telephone support. Ask your dealer or order directly using your credit card.

**1-800-992-0085**
(In Mass. 617-641-0400)

Ask about our other products including M A C E ™, the character editor for designing special symbols, and ESCapade™, for getting the most out of your printer.

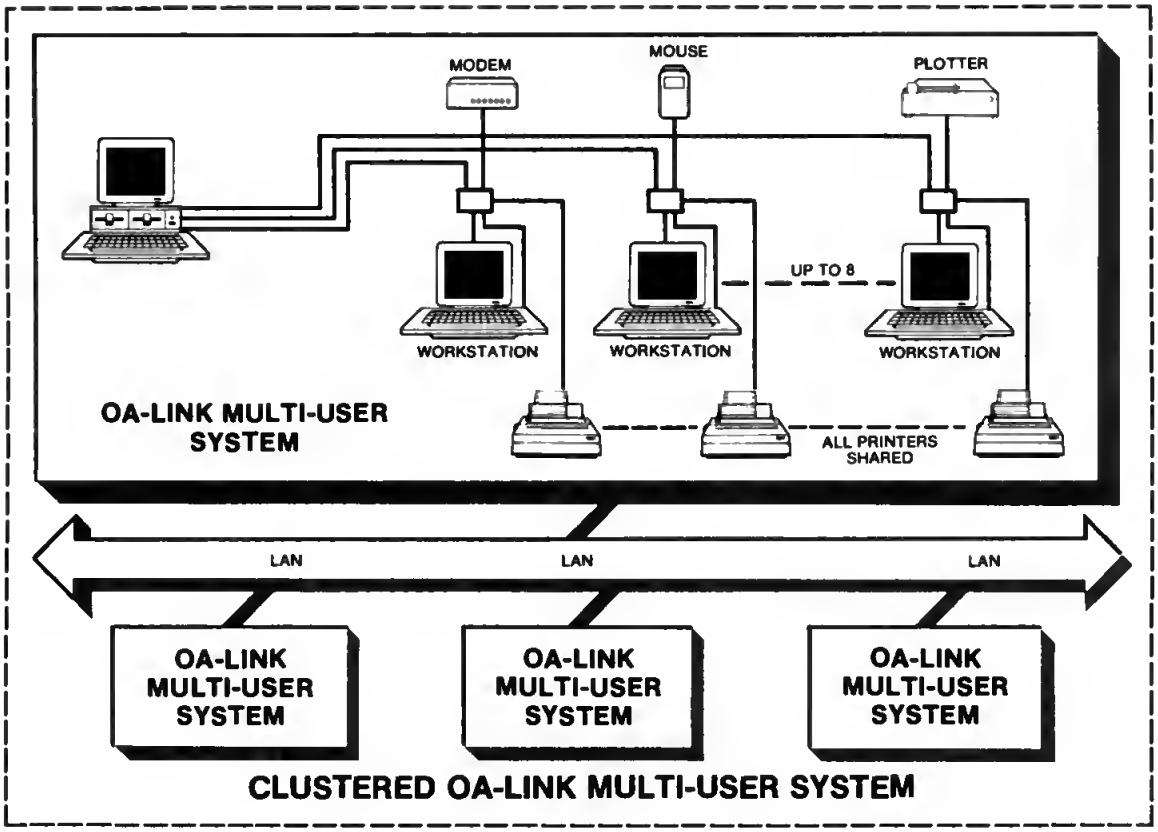
Analytx International, Inc.
1365 Massachusetts Avenue
Arlington, MA 02174




* Includes normal handling and shipping. Add $5 for foreign COD and POs. Special offer expires June 1, 1987.

Requirements: IBM PC with 320 KB and DOS 2.0 or higher. Works with or without a graphics board. FormWorx is a trademark of Analytx International, Inc.

CIRCLE 174 ON READER SERVICE CARD




# OA-Link, the unbeatable multi-user system... at a price you can't beat.

Our Business Machines has started a low cost revolution in office automation — with the OA-Link Multi-User System. And whether you're a small business or a Fortune 500 company, OA-Link's flexibility makes it an essential part of any computerized office.

**Product Description.**

OA-Link includes a V-20 CPU running at 6.67 MHz, 256K RAM memory expandable to 704K, and an IBM XT™ compatible BIOS for every user on your system. Your IBM PC/XT™ or compatible can utilize OA-Link to support from 2 to 9 users, with up to 200 feet between host computer and workstation. Parallel and serial ports are also available for each user. And OA-Link runs under DOS command. Password security as well as record and file locking are also standard. Better yet, these OA-Link workstation groups can be **clustered** together through your NOVELL,™ IBM PC-Net,™ or other LANs. Up to 2295 users can operate on a single LAN. And OA-Link is able to increase network performance by reducing the file server load.

**Outstanding Features.**

The OA-Link offers twice the speed of an IBM PC/XT. It's fully compatible with your XT, AT, and other compatibles — even the Compaq 386.™ And it runs all popular application software for the IBM PC, including Lotus 1-2-3,™ AutoCAD,™ dBASE III PLUS,™ and even RAM resident programs like SideKick™ and Microsoft Windows.™ OA-Link also allows users to **share any printer** on the system. And, other serial devices like mice, laser printers, modems, and plotters can be used at every workstation.

So start small, and as you expand, your OA-Link System will grow with you. And where else can you find a complete multi-user system with all of these features...at a cost of only **$695** per user?

IBM PC/XT, IBM PC-NET are trademarks of International Business Machines Corp. NOVELL is a trademark of Novell, Inc. Compaq 386 is a trademark of Compaq. Lotus 1-2-3 is a trademark of Lotus Development Corp. AutoCAD is a trademark of AutoDesk, Inc. dBASE III PLUS is a trademark of Ashton Tate. SideKick is a trademark of Borland International. Microsoft Windows is a trademark of Microsoft Corporation.

**OUR BUSINESS MACHINES, INC.**
9698 Telstar Avenue #307
El Monte, CA 91731
Tel: (818) 350-0683 • Fax: (818) 350-0682
Outside California: 1-800-433-1435

CIRCLE 253 ON READER SERVICE CARD

■ EDITED BY CHARLES PETZOLD

# PC TUTOR

*Using QuickBASIC with an EGA; turning down the volume on the PC's speaker; flipping between LPT1 and LPT2; dealing with the XT's mysterious slot 8.*

## QUICKBASIC 2.0 AND THE EGA

I've recently bought Microsoft's QuickBASIC 2.0 and have been converting some of my older BASIC programs using graphics to work with the Enhanced Graphics Adapter (EGA) high-resolution modes. These programs now use SCREEN 9, which offers 640- by 350-pixel resolution with 16 colors.

However, the way that tiling works with the EGA really has me confused. It's not explained at all in the manual, and I've had to do it by trial and error. Can you shed some light on this subject?

Further, the BSAVE and BLOAD commands don't seem to work right with the EGA. How can I get them to work?

Greg W. Griffith
Overland Park, Kansas

*The 600-page QuickBASIC 2.0 manual sure looks complete, except when you need to find something in it. It's amazing how much is not in there at all. EGA graphics certainly deserves a more extensive discussion.*

*The organization of video memory in the EGA high-resolution modes is fundamentally different from the Color Graphics Adapter (CGA). In the CGA medium-resolution mode (320 by 200 pixels with four colors), each pair of 2 bits represented 1 pixel. That pixel could be one of four different colors.*

*The EGA high-resolution video memory is organized as four color planes. There are separate planes for blue, green, red, and intensity. Each bit in each plane corresponds to 1 pixel. In the PAINT statement, the first 4 bytes in the tiling string are for these four color planes. The first byte represents the bit patterns for the blue plane, the second byte for the green plane, the third byte for red, and the fourth byte for the intensity plane.*

*For instance, the statement*

```
PAINT (x,y),CHR$(&HC8)+
CHR$(&HC1)+CHR$(&H8F)+
CHR$(&H81)
```

[Although shown on three lines so as to fit within the column, the statement above must be entered as a single line.—Ed.] *means to use pixel patterns of 11001000 (or &HC8) for blue, 11000001 (or &HC1) for green, 10001111 (or &H8F) for red, and 10000001 (or &H81) for intensity. These 4 bytes define the colors of a set of 8 pixels. The colors will be combined with one another so that the pixels from left to right are:*

| *Pixel* | *Color* |
|---|---|
| *1* | *High-intensity white (all on)* |
| *2* | *Cyan (blue and green)* |
| *3* | *Background (all off)* |
| *4* | *Background (all off)* |
| *5* | *Magenta (blue and red)* |
| *6* | *Red* |
| *7* | *Red* |
| *8* | *Yellow (green, red, and intensity)* |

```
DefInt A-Z
Def FnRand(X) = Int (X * Rnd)
Screen 9
For I = 1 to 25
        Line (FnRand(640),FnRend(350))-(FnRand(640),FnRand(350)),FnRand(16),BF
Next I
Call EgaBsave ("SAVESCRN", 0, 80 * 350)
Cle
Call EgeBload ("SAVESCRN")
End

Sub EgeBeeve (FileName$, Offeet, Length) Static
        Def Seg = &HA000
        Out &H3CE,4 : Out &H3CF,0
        Beeve FilaName$ + ".BLU", Offaet, Length
        Out &H3CE,4 : Out &N3CF,1
        Beeve FileName$ + ".GRN", Offaet, Length
        Out &H3CE,4 : Out &N3CF,2
        Beeve PileName$ + ".RED", Offeet, Length
        Out &B3CE,4 : Out &B3CF,3
        Beeve FileName$ + ".INT", Offeet, Length
        Out &H3CE,4 : Out &H3CF,0
End Sub

Sub EgeBload (FileName$) Static
        Out &H3C4,2 : Out &H3C5,1 : Bload FileNama$ + ".BLU"
        Out &B3C4,2 : Out &H3C5,2 : Bload FileName$ + ".GRN"
        Out &H3C4,2 : Out &H3C5,4 : Bload FileName$ + ".RED"
        Out &H3C4,2 : Out &H3C5,8 : Bload FilaNama$ + ".INT"
        Out &h3C4,2 : Out &N3C5,&B0F
End Sub
```

**Figure 1:** *This QuickBASIC 2.0 program demonstrates the use of two subroutines to save and load high-resolution EGA graphics displays to disk.*

## ■ PC TUTOR

*If you use the PALETTE statement, these colors will be different. If you use more than 4 bytes, the second set of 4 bytes will apply to the next scan line.*

*The BSAVE and BLOAD stotements are more of a problem, but this again results from the organization of EGA high-resolution video memory into color planes.*

*The four color plones of the EGA all occupy the some address, starting at A000:0000. When reading from the memory space, only one of the color plones is active. When writing to this memory space, any or oll of the color planes may be active. It is necessary to switch between the applicable color planes when doing a BSAVE and BLOAD and save each of the four color planes separately in different files. This is done by manipulating output ports on the EGA.*

*Figure 1 shows a QuickBASIC 2.0 program with two subroutines called EgaBsave and EgaBload that will do this for you. The progrom draws some random rectangles on the screen and colls EgaBsave. This has three parameters:*

```
EgaBsave (filespec,offset,length)
```

Filespec *is o filename* without an extension. *It can have a path.* Offset *will be 0 when you're working with the first video page.* Length *is the number of pixels on the display divided by 8. EgaBsave switches through the four color planes for reading the display and does o BSAVE on each one while appending the extension BLU, GRN, RED, and INT to the filename.*

*After that, this demonstration program cleors the screen and loads the four color planes back in using EgaBload. EgaBload requires only a filespec. It switches through the four color planes for writing to the display and BLOADs each of the four files. Particularly if you're loading these files from a floppy diskette, you'll clearly see that eoch of the four color planes is loaded separately.*

*Note that manipulating the EGA registers in o program that uses the EGA may have some unforeseen consequences, but it appeors that the BASIC routines leove the EGA in o normal stote and don't seem to be adversely affected when you mess with the registers.*

---

### SWAPPING PRINTERS

We have recently purchased a second printer for our IBM PC to have the speed of a dot matrix for in-house work and a daisy wheel for output that other people must read.

Our old printer is connected to LPT1, and the new printer is connected to LPT2. But how can we switch between them? A salesman at the computer store said he remembered having seen something of the kind in your magazine.

Elizabeth Bozzell
Fort Worth, Texas

*John Dickinson's LPTPORT program appeared in "The Great Printer Swop" (Programming/Utilities, Volume 4 Number 5). While John's version did the job in only seven lines of ossembly language code, I've managed to cut it down to five ond have renamed it PRNSWAP.*

*First, load DEBUG. Then type the following commands into DEBUG:*

```
N PRNSWAP.COM
A
POP DS
MOV AX,[40
XCHG AX,[40
MOV [40
INT 20

R CX
D
W
Q
```

*(Be sure to include the blank line—just an <Enter>—after the INT 20.) This will create o 13-byte file called PRNSWAP .COM. Running PRNSWAP switches the printers connected to LPT1 and LPT2. Running it agoin switches them back. The*


SHARING SOLUTIONS

MASTER SWITCH NETWORKING UNIT

• 2, 3, 5, or 9 ports
• Any port to any port
• Up to 1 megabyte
• Serial, parallel or both
• From $350

This very smart switch connects several computers to several peripherals, such as printers, modems, or host computers. A code sent to the unit selects the destination. All ports can communicate to any other port concurrently. Features include configuration menu, form feed, initialization strings, priority, status, cancel, timeout disable, front panel display, and many more.

Caretaker Plus AUTOMATIC SWITCH

This is printer sharing at its best. All computers can send data simultaneously. The data is released to the printer in the order it was received. Auto form feed and setup strings keep printer jobs separated. From the front panel you can clear any port. Operation is fully automatic. No changes to your software are required.

• 4 or 8 computers to one printer
• Up to 256K memory
• Serial or parallel
• From $395

PORTER CODE ACTIVATED SWITCH

The PORTER is a versatile unit for port expansion. It is used widely for data collection, telecommunications, factory automation, and multiple printer control. Data can be received and transmitted simultaneously on all ports and is routed by command. Other commands include wait, go, copy, and clear buffer. It is often used as an add on to a local area network.

• One computer to 4 or 8 peripherals
• Up to 256K memory
• Serial or parallel
• From $295

Additional Interface Products

• Printer buffers
• Manual switches
• Protocol converters
• Cables and adapters
• Modems/line drivers
• Multiplexers

• One year warranty
• Full technical support
• 30 day money back guarantee
• OEM and custom configurations
• Call us for all your interface needs

ROSE ELECTRONICS
P.O. BOX 742571
HOUSTON, TX 77274
CALL FOR CATALOG
713 933 7673

CIRCLE 290 ON READER SERVICE CARD

# PeachText 5000: Five Office Productivity Packages for the Price of One

Just $199

### Five Best Products: One Low Price

If you're shopping for productivity software, check out PeachText 5000™—the only product that gives you the five most popular office applications at an exceptionally low price. These powerful productivity packages from Peachtree Software work in unison to increase the efficiency of your office without breaking your budget.

### PeachText: Ultimate Word Processing

With PeachText Word Processor, you can write, edit and print perfect documents of any type. PeachText offers advanced word processing features in an easy-to-use format.

- Standardizes document set-up with 24 pre-defined templates for business letters, memos, manuscripts, etc.
- Allows editing of one document while printing another.
- Customizes standard documents with variable information.
- Supports specialty print functions, such as underlining, boldface, sub- and superscript, variable character pitch and adjustable lines per inch.
- Includes reference cards, self-instruction lesson plans and sample documents for quick learning.

### Spelling Proofreader: Eliminates Errors

Your documents will be letter perfect after being checked against Spelling Proofreader's 20,000 word standard dictionary. A 30-page document (10,000 words) can be proofed in just one minute.

Both a medical and legal dictionary are included with Spelling Proofreader, and the standard dictionary is expandable based on your additions.

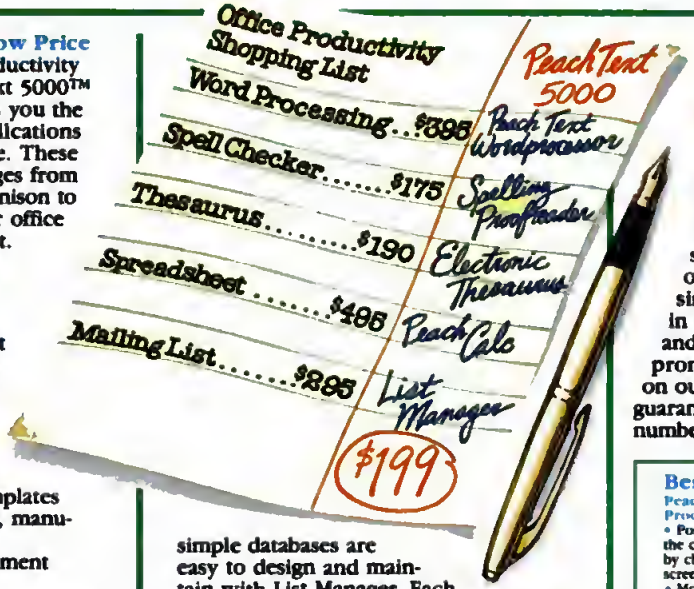
### Electronic Thesaurus: Vocabulary Booster

When you're looking for just the right word, let the Random House Electronic Thesaurus™ find it, using 4,400 indexed words and 26,000 synonyms. With just one keystroke, this handy package will give you a variety of word replacement options as you edit your PeachText documents.

### List Manager: Recordkeeping Made Simple

Mailing lists, membership lists and simple databases are easy to design and maintain with List Manager. Each individual record contains up to 14 full-line items of information.

With List Manager, you can produce mass mailings (including personalized letters), sort your data for on-line review or print out, plus generate detailed reports according to formats you define.




### PeachCalc: Master Number Cruncher

With its easily designed row-by-column worksheets, PeachCalc Electronic Spreadsheet gives you the valuable numeric information you need to control your business operations.

PeachCalc comes complete with ready-to-use templates, including Weekly Cashflow Manager, Automobile Expense Analyzer, Annual Budgeting, Property Listing and Evaluation, Personal Calendar, and Stock Portfolio Manager. All formulas are included, just fill in your numbers.

### All-in-One Productivity: Just $199

PeachText 5000 offers the five productivity software packages you need most at a single Peachtree price—$199. It's a convenience and bargain you can't afford to miss.

### Support When You Need It

Peachtree Software's famous technical support, labeled by *InfoWorld* as "the finest in the industry", is available as you need it via a toll-free telephone number. You pay only for the time it takes to answer your specific questions, without unnecessary support contracts.

### Money Back Guarantee

When you purchase PeachText 5000 directly from Peachtree Software, you're protected with a 30-Day Money Back Guarantee (an option even the most expensive productivity products don't offer). If you're not satisfied, simply return the complete product in saleable condition within 30 days and your purchase price will be promptly refunded. For full details on our support plan and money back guarantee, call the toll-free telephone number below.

### Best Features at the Best Price:

**PeachText Word Processor**
- Positions and moves the cursor within text by character, word, line, screen page
- Moves, copies, inserts and deletes blocks of text.
- Automatically word wraps during insertion and deletion.
- Formats paragraphs flush left, flush right, centered or justified
- Searches and replaces specified strings of text.
- Allows variable headers and footers longer than one line to appear automatically at the top and bottom of documents
- Prints entire document or specified pages.
- Prints to screen for preview of printed document

**Spelling Proofreader**
- Contains expandable standard 20,000-word dictionary
- Includes medical and legal dictionaries
- Screen display indicates total number of words, number of unique words and number of words not matching dictionary

**Electronic Thesaurus**
- 4,400 indexed words
- 26,000 synonyms
- Displays synonym list at bottom of screen.
- Provides option of replacing selected word with selected synonym

**List Manager**
- Records may contain up to fourteen line items or a total of 509 characters.
- Allows records to be added, deleted or modified
- Contains one primary and two secondary cross indexes per file
- Files may be combined even if they are defined differently
- Prints all records or selected records
- Prints labels on continuous form, single roll, or directly on envelopes
- Sorts records for reports on any of 14 items, with text comparisons in either descending or ascending order.

**PeachCalc**
- 254 rows by 63 columns
- Opens two windows for simultaneous display of worksheet sections.
- Displays numbers in integer, decimal, symbolic/graphic and scientific notation
- Text may be entered in cells
- Rows and columns may be inserted, deleted, copied and moved.

### Hardware Specifications

Requires MS-DOS version 2.0 or higher with 128K RAM. For use with the IBM® PC, PC XT, PC AT and compatibles. IBM is a registered trademark of International Business Machines

To order, or for a dealer near you, call

**1-800-247-3224**

In Georgia, call 1-404-564-5800

To order send $199 plus $5.00 shipping to:

**Peachtree Software**

4355 Shackleford Road, Dept. PCM-032, Norcross, GA 30093

CIRCLE 358 ON READER SERVICE CARD

# The expert's solution to complex systems problems.

When there's a question concerning networking, systems design and integration, applications development, data-communications, PC-to-mainframe connections—just about anything that deals with computers—we'd bet that others in your company turn to you, the systems expert.

Being knowledgeable about microcomputers is very demanding, and not many people take the time or trouble to stay up-to-date. But you do, and that's what keeps you in such high demand.

That's why PC TECH JOURNAL is so important to you. As a regular reader of PC TECH JOURNAL you receive comprehensive, hands-on reviews of the software and applications you have to know about. You'll find well researched articles about systems design and integration, and discover technological innovations that will help you increase the performance and efficiency of your system.

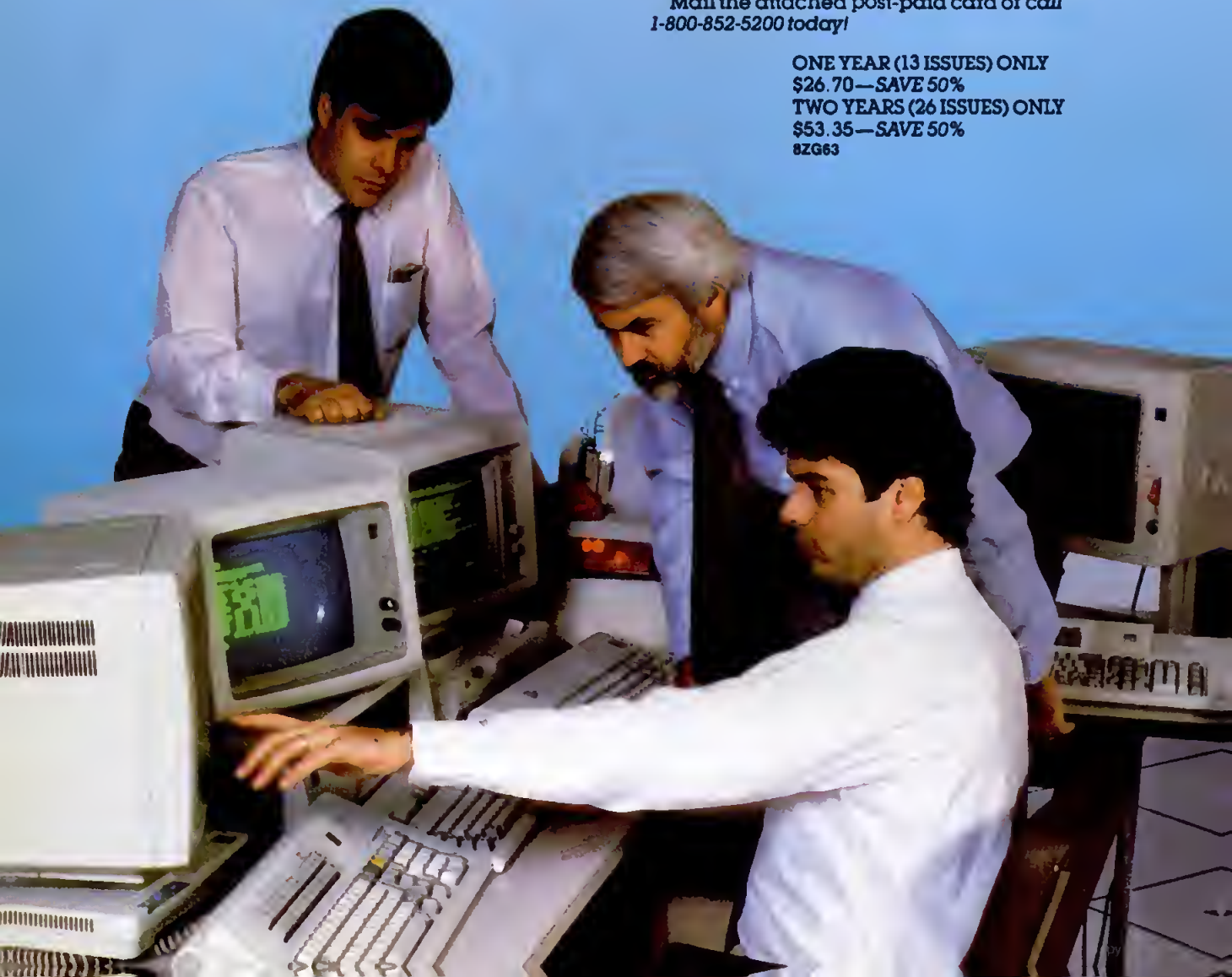
Only in PC TECH JOURNAL can you find expert coverage on iRMX based real-time operating systems, evaluations of 6 BASIC interpreters, 9-track tape subsystems, and how to best obtain the performance of a 5251 terminal on PCs, XTs and ATs.

**PLUS, you'll receive our special 13th issue, the PC TECH JOURNAL DIRECTORY, the most comprehensive, indexed reference guide and resource to the products and applications covered in PC TECH JOURNAL.**

***Subscribe today and save 50% OFF the annual single-copy price of $53.35.***

**Mail the attached post-paid card or *call 1-800-852-5200 today!***

**ONE YEAR (13 ISSUES) ONLY**
**$26.70—*SAVE 50%***
**TWO YEARS (26 ISSUES) ONLY**
**$53.35—*SAVE 50%***
**8ZG63**



## ■ PC TUTOR

*program works by swapping the port addresses located in the BIOS data area. This swapping may not work, however, if you use software print buffers that have been loaded before you swap the printers.*

**DOWN WITH THE DIN**

I have been trying to find a way to turn down the volume on the speakers on our XTs. Although the beeps are useful when using software, they disturb people working around the computers.

Is there any way I can turn down the volume without disconnecting the speaker entirely?

Richard Watanabe
Los Angeles, California

*The PC speaker is a simple affair. It's just driven by a simple digital square wave. There's no way in software to turn down the volume. You may notice that the speaker response is not linear—different frequencies have different volumes—so it might be possible to have a resident program intercept the BIOS interrupt 10h "Teletype" routine (which is the only access to the speaker that the BIOS provides) and make the beep a different frequency that is not quite as loud. But many programs have their own beep routines, so this wouldn't be a universal solution.*

*In hardware, you could put a resistor in series with the speaker, but I'm not sure you'd like to attack the inside of your XTs with a soldering iron.* [If you do know how to solder, the job is easy. You might start experimenting to find the right value resistor with a 10-ohm, ½-watt type, available at any Radio Shack. —Ed.]

*Instead, I recommend a real low-tech solution. Take the covers off the machines, just stick something in front of the speaker, and put the covers back on. A few pieces of corrugated cardboard should muffle the sound well enough.*

■ The PC speaker is a simple affair. There's no way in software to turn down the volume.

**THE EIGHTH SLOT**

The IBM PC-XT and the IBM Portable Computer have a motherboard that includes eight slots. I have heard from a couple of people that the eighth slot (the one closest to the power supply) is a little "funny" and that it should not be used. It's the


RACORE
...over 30,000 PCjrs perform like PCs.

add PC performance to your PCjr

Drive Two Plus™ gives the IBM PCjr the performance capabilities of a PC by adding a second drive plus enhancements. Your PCjr can now run PC software.

The unit includes a parallel port, a second 360K disk drive, a clock calendar with battery back-up, additional power to the side bus and a memory expansion slot.

Drive Two Plus with DMA $349. $299.00

Expand PCjr Memory to 640K
RACORE's expansion board boosts PCjr memory in 256K increments up to 640K. This plug-in board installs in the Drive Two Plus, or the 10/20 MB expansion units.

Memory Expansion Board
256K $119.00
512K $149.00

10MB Fixed Drive
Similar to the Drive Two Plus, except that the second drive is a 10 MB fixed drive; a version of this drive can also be added as a third drive. $795.00

20MB Fixed Drive
Similar to the Drive Two Plus, except that the second drive is a 20 MB fixed drive; a version of this drive can also be added as a third drive. $895.00

Choose from 3 popular keyboards for your PCjr.
Keyboard packages come complete with adapter cable.
PC Style $ 99.00
AT Style $ 119.00
5151 Style $ 139.00

RACORE's continuing commitment to the PCjr.
Since 1983, RACORE has continued to enhance the capability of the IBM PCjr. Our guarantee: If, within 30 days of purchase, any PCjr enhancement product supplied by RACORE fails to perform as promised, we'll replace that product at our expense or, refund the purchase price. No exceptions.

TO ORDER OR FOR INFORMATION
CALL TOLL FREE
CIRCLE 167 ON READER SERVICE CARD
1-800-325-1833
1-800-521-6366 in Calif.
Prices effective: January 12, 1987
BBS: (801) 363-8720

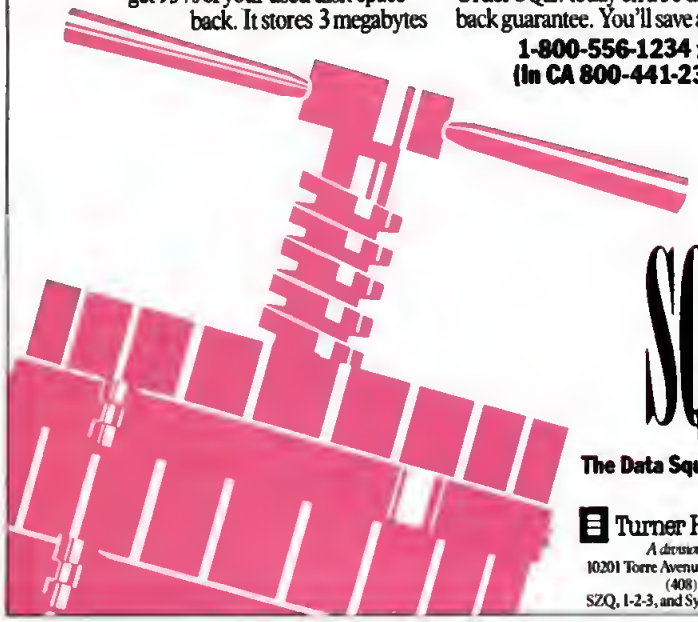
RACORE Computer Products Inc.
170 Knowles Drive
Los Gatos, CA 95030
Phone (408) 374-8290

RACORE, Drive Two Plus are registered trademarks of RACORE Computer Products, Inc
IBM, PC, XT, AT, PCjr are registered trademarks of IBM Corporation

# $79.95 Hard Disk.

Almost. It's SQZ!, the ultimate reducing program for 1-2-3, Symphony, and V.P. Planner. SQZ! squeezes spreadsheet files by up to 95%. So you get 95% of your used disk space back. It stores 3 megabytes on a 360K floppy. And 100 megs on a 10 meg hard disk. Working in the background (memory resident) or the foreground, without you lifting a finger. Order SQZ! today on a 30 day, money-back guarantee. You'll save a ton.

**1-800-556-1234 x527**
**(In CA 800-441-2345 x527)**



SQZ!™

**The Data Squeezer for Lotus**

Turner Hall Publishing
*A division of Symantec*
10201 Torre Avenue Cupertino, CA 95014
(408) 253-9607
SZQ, 1-2-3, and Symphony are trademarks.

CIRCLE 361 ON READER SERVICE CARD

# *Personal VM* on your PC!

*Personal VM* supports most of the VM/CMS functions found on the IBM mainframe computers. This power is now available on your IBM PC, XT, or AT and compatibles.

*Personal VM* runs most existing DOS applications without modification and eliminates cumbersome pathnames by automatically searching minidisks.

Interfaces with KEDIT and REXX from Mansfield Software Group.

Requires 256K IBM PC, XT, AT or compatible
Uses monochrome or CGA color display
Requires DOS 2.0 or above
Several users can be defined to access PVM with one session active at a time

***Personal VM* features:**

- CP and CMS commands
- CMS filetype support
- DOS compatibility
- LOGON security
- Minidisk support
- Virtual devices
- Virtual spooling
- Accounting records
- VM-style screens
- User synonyms
- PF key definitions
- User profiles
- Privilege levels
- Log message support
- No additional hardware or software required

$295 (quantity discounts available)
$35 demo copy

(800) 247-4503 (*Personal VM* orders only)
(301) 564-8553 (inquiries & technical support)

VM Labs, Inc.

1707 Belle View Blvd Suite C2 Alexandria, VA 22307

CIRCLE 286 ON READER SERVICE CARD


## ■ PC TUTOR

shortest of my short slots, but I'm sure that my parallel printer board would fit there physically.

What's the story on the eighth slot?

Jerry Mahun
Platteville, Wisconsin

*According to IBM's* Technical Reference *manual for the XT, "Slot J8 is slightly different from the others in that any card placed in it is expected to respond with a 'card selected' signal whenever the card is selected." Elsewhere the manual indicates that "Timing requirements on slot J8 are much stricter than those on slots J1 through J7."*

*These two statements refer to signals that pass between the system board and the expansion board in slot 8. All of the address lines, data lines, and read and write signals for both memory and I/O are different from the signals on the other seven slots.*

*In other words, you heard right: slot 8* is *a little "funny." Expansion boards that are not designed for slot 8 should not be used there. Specifically, the IBM Printer Adapter should not go in slot 8.*

*The IBM Asynchronous Adapter (otherwise known as a serial port) board has a jumper that allows the board to be used in slot 8. Many XTs are sold with the Asynchronous Adapter installed in that slot. I've seen some other boards (most recently the Video-7 VEGA and the Quadram QuadEGA) that also include a jumper if you want to put them in slot 8.*

■ Slot 8 *is* a little "funny." Boards not designed for it should not be used there.

**ASK THE PC TUTOR**

The PC Tutor solves practical problems and explains points of general interest. To see your questions answered here, drop a line to PC Tutor, *PC Magazine*, One Park Avenue, New York, NY 10016. PC

# PC Magazine's Direct Marketing Connection For PC Products and Services

**For many of you, mail order is your primary means of purchasing PC products and services.**

In fact, in recent interviews with our subscribers, we learned that 70% bought PC products and services through direct marketing channels during the past year.*

You buy direct because it's convenient, because you know exactly what you want and don't need any hand-holding.

PC MAGAZINE

The following special section, PC Magazine's Direct Marketing Connection, is what you've been demanding. It connects you with the direct marketers who are anxious to please you. By having them all in one place, you can quickly zero in on the products you need from the vendors you want to buy through.

*Starch Study, July 1986

**TAPE BACKUP**
20Mb Int ..... 359
40Mb Int ..... 499

**HARD DRIVE KITS**
20Mb (XT) ..... 339
30Mb (XT) ..... 399

**AT HARD DRIVES**
30Mb ..... 499
40Mb ..... 599

**HARD DRIVE CARDS**
20Mb ..... 399
30Mb ..... 499

**TAXAN 760 EGA + TAXAN 560 AutoSwitch** ..... 699

**MITSUBISHI**
1410 EGA ..... 449
1430 EGA ..... 499

**SONY REMOTE TV 13" & COLOR MONITOR**
1311CR ..... 399

**HERCULES**
Color Card ..... 149
Graphics Plus ..... 179

**TAXAN MULTI VISION 770 + TAXAN 557 Gold Card** ..... 829

**NEC MULTISYNC**
+ NEC GB-1 ..... 899
+ Vega Deluxe ..... 849

**NEC PRINTERS**
P6 - Par ..... 429
P7 - Par ..... 599

**EVEREX MODEMS**
1200 Int w/sw ..... 99
2400 Int w/sw ..... 199

# ★NEW LOWER PRICES ★COMPARE & SAVE★

## PRINTERS

**ALPS** Color Printers
ALQ 218 ..... $449
ALQ 224 ..... 499
ALQ 318 ..... 649
ALQ 324 ..... 699
P2000 Ser & Par w/Tractor ..... 699
P2100 S & P w/Tractor ..... 1199
P2418 S & P w/Tractor ..... 949
P2424 S & P w/Tractor ..... 999

**BROTHER** LO & dot printers CALL

**CITIZEN** 120 D ..... 189
MSP 10 ..... 279
MSP 15 ..... 369
MSP 20 ..... 309
MSP 25 ..... 459
Premiera 35 ..... 459
Tribute 224 ..... 699
Sheet Feed: MSP 10/15/20/25 ..... 220
Sheet Feed: Premiera 35 ..... 390

**DICONIX** 150 InkJet Portable
Parallel ..... 329
Serial ..... 349

**EPSON** Printers ..... CALL

**NEC** P5XL Color - Par ..... 979
P6 - Par ..... 429
CP6 Color - Par ..... 519
P7 - Par ..... 599
CP7 Color - Par ..... 689
Bi-Di Tractor for P5 ..... 180
Uni-Di Tractor for P2/P6 ..... 60
Bi-Di Tractor for P2/P6 ..... 160
Uni-Di Tractor for P3/P7 ..... 80
Bi-Di Tractor for P3/P7 ..... 170
Bi-Di Tractor for P5 ..... 180
Cut Sheet Feeder for P5 ..... 350
Cut Sheet Feeder for P2/P6 ..... 230
Cut Sheet Feeder for P3/P7 ..... 290

**OKIDATA** 192 PLUS ..... 329
193 PLUS ..... 499
292 E w/module ..... 529
Tractors for above ..... 60
Cut Sheet Feeds for above ..... 290

**PANASONIC** 1080 i ..... 199
1091 i ..... 259
1092 i ..... 329
1592 ..... 399
1595 ..... 479

**TOSHIBA** 321 ..... 449
New 341 E ..... 699
New 351 P/S Model II ..... 979
351 P/S Color ..... 1299
Uni-Di Tractor: 321/341/351 ..... 120
Bi-Di Tractor 341/351 ..... 190
Cut Sheet Feed: 321 ..... 220
Cut Sheet Feed: 341/351 ..... 290

★Limited Time Offer★

**KENSINGTON** Printer Stand ..... 20
With Printer ..... 10

## LASER PRINTERS

**OKIDATA** Laserline 6 ..... $1799
Interface Modules ..... CALL

**LASER CONNECTION**
PS Jet Printer (Ser) ..... 3999
PS Jet (Adds Post Script) ..... CALL

**QUADRAM**
NEW QUADLASER-LS1101 ..... 3399

**TOSHIBA** PageLaser 12 ..... 2999

## DRIVES

★ All Drives Shown Are Internal ★

**FUJITSU** Floppy Drives
360k ½ Ht Floppy (PC/XT) ..... $89
With Grey face plate (AT) ..... 99

**TEAC** Floppy Drives
360k ½ Ht (PC/XT) ..... 89
With Gray Face Plate (AT) ..... 99
1.2 Mb ½ Ht (AT) ..... 119

**ASI** Hard Drive on Card
20 Mb Handy Card ..... 399
30 Mb Handy Card ..... 499

**FUJI** Hard Drives
20 Mb Int ½ Ht w/cont ..... 339
30 Mb Int ½ Ht w/cont ..... 399
30 Mb Int ½ Ht (AT) ..... 499
Compaq Kits (Spacify Model) CALL

**MINISCRIBE** Hard Drives
20 Mb Int ½ Ht w/Ccont ..... 339
30 Mb Int ½ Ht w/Cont ..... 399
40 Mb Int Full Ht (AT) ..... 599
70 Mb Int Full Ht (AT) ..... 869
Compaq Kits (Specify Model) CALL

**PLUS** Hard Drive on Card
★Limited Time Offer★
20 Mb HardCard ..... 575
286 Upgrade Kit ..... CALL

**PRIAM**
40 Mb Int w/Cont (PC/XT) ..... 1199
40 Mb Int (AT) ..... 999
60 Mb Int w/Cont (PC/XT) ..... 1499
60 Mb Int (AT) ..... 1299
Compaq Kits (Specify Model) CALL

**SEAGATE** Hard Drives
20 Mb Int ½ Ht w/Cont ..... 339
30 Mb Int ½ Ht w/Cont ..... 399
30 Mb Full Ht (AT) ..... 549
40 Mb Full Ht (AT) ..... 849
40 Mb Half Ht (AT) ..... 649
80 Mb Full Ht (AT) ..... 999
Compaq Kits (Specify Model) CALL

## BACKUP

**ALLOY** Tape Backup
20/25 Mb for PC/XT or AT ..... 359
40 Mb for PC/XT or AT ..... 499

**EVEREX** Tape Backup
20 Mb Int/Ext ..... 549/669
60 Mb Int/Ext ..... 749/849

**IRWIN** Tape Backup
20 Mb Int for XT or AT ..... 399
40 Mb Int for XT or AT ..... 499
20 Mb/40 Mb Ext for XT/AT ..... CALL

## CHIPS ETC

64k RAM set of 9 ..... $10
256k RAM Set of 9 ..... 30
8087-3 PC/XT 5 Mhz ..... 109
8087-2 PC/XT 8 Mhz ..... 139
80287-3 AT 6 Mhz ..... 159
80287-8 AT 8 Mhz ..... 259
80287-10 AT 10 Mhz ..... 319
Inboard 386/AT Coprocessor CALL

## MONITORS

**AMDEK** 310A Amber ..... $149
410 Amber/Green/White ..... 199
MDS Genius VHR Full Pg Display w/Controller ..... 1299

**MITSUBISHI** XC-1409 ..... 319
XC-1410 EGA ..... 449
XC-1430 EGA ..... 499
AUM-1371 Diamond Scan ..... CALL

**NEC** MultiSync ..... 549
With ATI EGA Wonder ..... 799
With NEC GB-1 ..... 899
With Quad EGA ProSync ..... 899
With Vega Deluxe ..... 849

**SONY** TV/Monitor 1311CR ..... 399
Multiscan 1302 ..... CALL

**TAXAN** 635 (640x400) ..... 419
With Taxan Graphics 555SP ..... 569
650 (720x400) ..... 479
With 557 Gold Card ..... 759
760 (640x350) 14" ..... 439
With 560 Auto Switch ..... 699
770 MultiVision ..... 549
With 557 Gold Card ..... 829
840 (720x400) 16" ..... 799
With 557 Gold Card ..... 1069
With Sigma 400 ..... 1199
New 860 EGA 16" ..... CALL

**THOMPSON** Color/Green ..... 299

## MULTI-FUNCTION CARDS

**AST** Sixpack Plus w/64k ..... $159
Sixpack Premium w/256k ..... 199
Advantage AT w/128k (64k) ..... 329
Advantage AT w/512k(256) ..... 429

**INTEL**
Above Board PC 64k ..... 229
Above Board PS 64k ..... 259
Above Board AT 128k ..... 339
Above Board PS/AT 128k ..... 399
Inboard 386/AT ..... CALL

**ORCHID**
TinyTurbo 286 ..... 399
PCturbo 286e w/1Mb ..... 799
New Jet 386 ..... 999

## MODEMS

**EVEREX** Internal ½ Card
1200B w/software ..... $99
2400B w/software ..... 199

**HAYES** 1200B w/smartcom II ..... 319
1200 Ext ..... 349
2400B w/smartcom II ..... 549
2400 Ext ..... 569
Smartcom II ..... 99

**TOSHIBA** 1200B for T1100+ ..... 299

## COPIERS

Canon P-25 ..... 899
Sharp Z-50 ..... 599
Cartridges ..... CALL

## DISPLAY CARDS

**ATI** EGA Wonder ..... CALL

**HERCULES** Color Card ..... 149
Graphics Card Plus ..... 179
New InColor ..... CALL

**NEC** Multisync GB-1 ..... 369

**QUADRAM**
QuadEGA ProSync ..... 359

**STB** Chauffer HT ..... 199

**TAXAN** 555SP Color ..... 189
557 Gold Card - EGA ..... 299
TAXAN 560 AutoSwitch - Same as Paradise AutoSwitch ..... 279

**VIDEO-7** Vega Delux ..... 319

## KEYBOARD/MOUSE

**IBM** PC Original Keyboard ..... $149

**KEYTRONIC** 5151 Deluxa ..... 159
5153 w/Touch Pad ..... 259

**IMSI** Optimouse w/Dr. Hallo II ..... 109

**LOGITECH** Logimouse ..... CALL

**MICROSOFT** Mouse Includes Paintbrush & Show Partner
Serial Version ..... 119
Bus Version ..... 109

**MOUSE SYSTEMS**
PC Mouse (ser) w/Dr Hallo II ..... 109
With PC Paint+ ..... 119
With PC Paint+ & Ready ..... 149
PC Mouse Bus + w/PC Paint+ ..... 119

**SUMMAGRAPHICS**
Summa Mousa w/Pad ..... 85

**TORRINGTON** Manager Mouse ..... 89
With Keytree & Telepaint ..... 129
Manager Mouse - Cordless ..... 159

## POWER

**COMPUTER ACCESSORIES**
P2 Power Director ..... $89
P15 Power Director ..... 99

**DATASHIELD**
125 Power Center ..... 89
150 Power Center ..... 119
300 Watts Backup ..... 369
350 Turbo Backup ..... 499
500 Watts Backup ..... 599
800 Watts Backup ..... 899

**KENSINGTON**
Masterpiece ..... 99
Masterpiece Plus ..... 119
NEW Masterpiece Remote ..... 119

**MINUTEMAN**
250 Watts Backup ..... 299
300 Watts Backup ..... 469
500 Watts Backup ..... 599
1000 Watts Backup ..... 1199

## FAX MACHINES

Canon FaxPhone ..... 1799
AT&T 3510D ..... 1999
Sharp 200 ..... 1599
Sharp 600 ..... 2199
New Sharp 620 ..... CALL
FAX Paper ..... CALL

**POLICY:** Min order $100. Prices & availability subject to change. Shipping charges vary. Prices reflect discount for advance payment. Personal/company checks take 3 weeks to clear. Add 2% (Min $5) for COD. Discover, MC, & Visa and 5% for Amex. COD requires cash or cashier check. No showroom, demos or walkin sales. Call for open acct. PO requirements & special prices. All sales final. Refused shipments subject to a 20% charge (Min $50). Not responsible for compatibility.
**FOR ADVANCE PAYMENT OR PICKUP, PLEASE CALL FIRST FOR WORKORDER #.**

**AMEX DISCOVER MC VISA**

# MICROBEST 714-897-2100

**12605 HOOVER STREET, GARDEN GROVE, CA 92641**

**PLEASE REFER TO AD # PC 790**

# 1200B MODEM $99.95 FOR IBM W/ SOFTWARE 2400B MODEM $199.95

## MULTIFUNCTION CARDS

*FROM MODULAR CIRCUIT TECHNOLOGY*

### MCT-MF $84.95

*ALL THE FEATURES OF AST'S SIX PACK PLUS AT HALF THE PRICE!*

- 0-348R DYNAMIC RAM USIND 4164s
- INCLUDSS SSRIAL PORT, PARALLEL PRINTER PORT, DAME CDNTRDLLER PORT AND CLOCR/CALENDAR
- SOFTWARE FDR A RAMDISK, PRINT SPOOLER AND CLOCK/CALENDAR

### MCT-ATMF $139.95

*ADDS UP TO 3 MB OF 1 BIT RAM TO THE AT*

- USSR SKPANDABLE TO 1.5 MS OF ON-BOARD MEMDRY (NO MEMORY INSTALLED)
- FLEXIBLE ADDRSSE CDNFIGURATION
- INCLUDSS SERIAL PORT, PARALLEL PORT AND CLOCK/CALENDAR
- OPTIONAL PIGGYBACK BOARD PERMITS EXPANSION TO 3 MB

**ATMF-SERIAL** 2nd SERIAL PORT $24.95

**MCT-ATMF-MC** $29.95
PIGGYBACK SOARD (ZERO K INSTALLED)

### MCT-MID $79.95

*A PERFECT COMPANION FOR OUR MOTHERBOARD*

- 2 DRIVE FLOPPY DISK CONTROLLER
- INCLUDSS SSRIAL PORT, PARALLEL PORT, GAMS PORT AND CLDCK/CALENDAR WITH BATTSRY BACK-UP
- SOFTWARE FDR A RAMDISK, PRINT SPOOLER AND CLOCK/CALENDAR

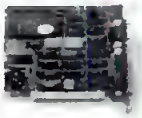
**MIO-SERIAL** 2nd SERIAL PORT $15.95

### MCT-ID $59.95

*USE WITH MCT-FH FOR A MINIMUM OF SLOTS USEO*

- SERIAL PORT ADDRSSSABLE AS COM1, COM2, COM3 OR COM4
- PARALLEL PRINTER PORT ADDRSSSABLE AS LPT1 OT LPT2 (x378 OR x278)
- GAMS PORT AND CLOCK/CALENDAR WITH A BATTERY BACK-UP

SHORT SLOT



**IO-SERIAL** 2nd SERIAL PORT $15.95

### MCT-ATIO $59.95

*USE WITH MCT-ATFH FOR A MINIMUM OF SLOTS USED*

- SSRIAL PORT ADDRSSSABLE AS COM1, CDM2, COM3 OR COM4
- PARALLEL PRINTER PORT AODRESSABLE AS LPTA OR LPTS (x378 OR x278)
- GAME PORT
- USSS 16450 SERIAL SUPPORT CHIPS FOR HIGH SPESD DPERATION IN AN AT

SHORT SLOT

**ATIO-SERIAL** 2nd SERIAL PORT $24.95

## RAM CARDS

*FROM MODULAR CIRCUIT TECHNOLOGY*

### MCT-RAM $89.95

*A CONTIGUOUS MEMORY SOLUTION FOR YOUR SHORT OR REGULAR SLOT*

- SHORT SLOT, LOW POWER PC COMPATISLE DSSION
- CAN OFFSR UP TO S76K OF ADDITIONAL MEMORY
- USER SELECTABLE CONFIGURATION AMOUNTS DF 192, 384, 512, 256 & S76K, USING COMSINATIONS OF 64 & 256R RAM

SHORT SLOT

### MCT-ATRAM $149.95

*A POWER USER'S OREAM, 4MB OF MEMORY FOR THE AT*

- USSR SKPANDABLE TO 2MB DF ON-BOARD MSMORY
- USSS FULL 16 BIT PARITY CHECKSD MSMORY, 64K DR 256K DYNAMIC RAM
- FLEXIBLE STARTIND ADDRESS, ROUND OUT CONVENTIDNAL MSMORY TO 640K & ADD SKTENDSD MEMDRY ABOVS 1MB

**MCT-ATRAM-MC** $39.95
2MB PIGGYBACK BOARD (ZERD K INSTALLED)

### MCT-EMS $129.95

*2MB OF LOTUS/INTEL/MICROSOFT COMPATIBLE MEMORY FOR THE AT*

- CONFDRMS TO LOTUS/INTEL EMS
- USSR SXPANDABLE TD 2 MB
- USSS 64K OR 256K DYNAMIC RAM (NO MEMORY INSTALLED)
- USE AS EXPANDED DR CONVSNTIONAL MEMORY, RAMDISR DR SPOOLER
- SOFTWARS INCLUDSS EMS DSVICS DRIVERS, PRINT SPOOLER AND RAMDISK

**MCT-ATEMS** AT VERSION OF THE MCT-EMS $139.95

## Seagate

## HARD DISK SYSTEMS

**20 MB $339** **30 MB $399**

*Systems include half height hard disk drive, hard disk drive controller, cables and instructions. Drives are pre-tested and warranted for one year.*

## Seagate 40 MB AT DRIVE

*FAST 40ms ACCESS TIME*

NEW! 1/2 HEIGHT

**$599**

## DISK CONTROLLER CARDS

*FROM MODULAR CIRCUIT TECHNOLOGY*

### MCT-FDC $34.95

*OUALITY OESIGN OFFERS 4 FLOPPY CONTROL IN A SINGLE SLOT*

- INTERFACSS UP TO 4 FDDs TO AN IBM PC OR CDMPATIBLS
- INCLUDES CASLIND FDR 2 INTSRNAL DRIVES
- USES STANDARD DS37 CDNNSCTDR FDR EXTERNAL DRIVES
- SUPPORTS BOTH DS/DD AND DS/QD WHEN USED WITH DOS 3.2 DR JFORMAT

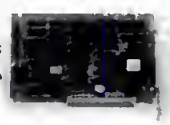
SHORT SLOT

### MCT-HDC $89.95

*HARD DISK CONTROL FOR WHAT OTHERS CHARGE FOR FLOPPY CONTROL*

- IBM XT CDMPATIBLS CDNTRDLLER SUPPORTS 15 DIFFERENT DRIVS SIZSS, INCLUDING 5, 10 20, 30 & 40MS
- DPTIDNS INCLUDE THS ASILITY TD DIVIDS 1 LARGE DRIVE INTD 2 SMALLER, LOGICAL DRIVES
- INCLUDES CASLIND FDR 1 INTERNAL DRIVE

SHORT SLOT



### MCT-RLL $119.95

*GET UP TO 50% MORE STORAGE SPACE ON YOUR HARD DISK*

- INCRSASSS THS CAPACITY OF PLATED MEDIA DRIVES SY 50%
- RLL 2,7 ENCDDING FOR MDRS RSLIASLE STORADE
- TRANSFSR RATE IS ALSO 50% FASTER, 750R/sec vs 500K/sec
- USE WITH ST-238 DRIVS TD ACHISVS 30+ MB IN A HALF HSIGHT SLOT

NEW!

### MCT-FH $139.95

*STARVED FOR SLOTS? SATISFY IT WITH THIS TIMELY DESIGN*

- INTERFACES UP TD 2 FDDs & 2 HDDs
- CASLIND FDR 2 FDDs & 1 HDD
- FLOPPY INTSRFACS SUPPORTS SOTH DS/DD & DS/QD WHEN USED W/DOS 3.2 DR JFDRMAT
- ALL POPULAR HDD SIZSS ARS SUPPORTSD, INCLUDINS 5, 10, 20, 30 & 40MS
- CAN DIVIDS 1 LARDS DRIVS INTD 2 SMALLER, LOGICAL DRIVES

### MCT-ATFH $189.95

*FLOPPY ANO HARD OISK CONTROL IN A TRUE AT DESIGN*

- ATCOMPATIBLE, CDNTROL UP TO 2 360K/720K OR 1 2MB FDDs AS WELL AS 2 HDDs USIND THS AT STANDARD CDNTRDL TABLES
- SUPPORTS AT STYLE FRDNT PANSL LED TO INDICATE HD ACTIVITY
- 16 SIT BUSS PRDVIDES RAPID DATA TRANSFSRS
- FULLY SUPPORTED BY AT SIDS

**JDR Microdevices** 110 Knowles Drive, Los Gatos, CA 95030
Toll Free 800-538-5000 • (408) 866-6200 • FAX (408) 378-8927 • Telex 171-110



THE JDR MICRODEVICES LOGO IS A REGISTERED TRADEMARK OF JDR MICRODEVICES. JDR INSTRUMENTS AND JDR MICRODEVICES ARE TRADEMARKS OF JDR MICRODEVICES
IBM IS A TRADEMARK OF INTERNATIONAL BUSINESS MACHINES.


CIRCLE 133 ON READER SERVICE CARD


COPYRIGHT 1987 JDR MICRODEVICES

Hi Resolution
Amber Screen
TTL Monitor
Lights For
Power, Turbo,
Hard Drive
Access Indicator,
Keylock Just
Like The AT
Look!
AT Style
Case With LED
Hard Drive Is
Mounted Inside
Case As In The AT
Silent Operating
360K Floppy Drive
(Second Drive Optional)
84-Key AT Style
Keyboard With LED
Lights And Large
Return Key

## Fully IBM Compatible

# 30MB XTURBO

## Complete System Ready To Plug In And Run

### Including TTL Hi Res Amber Monitor

NOW ONLY **$995.00**

**LOWEST PRICING EVER...** For a superb quality, fully compatible XTurbo Complete System. Not just an everyday ho-hum clone, but a true IBM workalike in a handsome AT Style Case with dazzling speed and every feature you want in an XTurbo.

With keyboard switchable 4.77 and 8 MHZ speeds, the Northgate XTurbo is an impressive package. It processes data two-thirds faster than the IBM XT. And with your choice of 10, 20 or 30 Megabyte hard drives, represents a truly exceptional value.

The Northgate XTurbo comes to you assembled, fully tested and ready to use. Just plug the monitor to the mainframe and turn on the electricity. Use it for 30 days. If for any reason you wish to return it, there's no questions asked. (Fewer than .001 ever come back).

Dollar-for-dollar, feature-for-feature, there's simply no better buy in the world. Northgate's massive purchasing power, combined with our unique direct marketing method makes it possible to bring these outstanding values to you. Compare price, compare features. Then Phone Northgate!

### Look! You Get All These Features At Industry Low Prices:

1. Dual Speed—Keyboard Switchable
2. 640K Mbrd., 256K RAM Installed
3. 8087 Co-Processor Socket
4. Eight Expansion Slots
5. 150-Watt Power Supply
6. Front Panel Turbo/Power/HD Lights
7. Can Boot-up in Turbo Mode
8. Unique, Heavy-Duty AT Style Case
9. Built-in Speaker
10. Runs all MS-DOS programs including 1-2-3, Flight Simulator, etc. and GW BASIC
11. Brand New (Not Rebuilt) Famous Brand Hard Drive and Controller Card
12. System Boots From Hard Drive
13. 360K Direct Drive (Not Belt Driven) Famous Brand Floppy Drive
14. Floppy Controller
15. AT-Style Keyboard, 84 Keys, LED Indicators and Large Return Key
16. Monographics (Hercules Compatible) Card With Printer Port
17. High Resolution TTL Amber Screen Monitor
18. System Assembled and Diagnostic Tested in our Labs.
19. One-Full-Year Limited Warranty
20. 30-Day Return For Refund Policy

### No Gimmicks, No Hidden Costs, Prices Are For Complete Systems

**OPTIONAL** **$845.00** COMPLETE
**Above System With 10 MB Hard Drive**

**OPTIONAL** **$949.00** COMPLETE
**Above System With 20 MB Hard Drive**

**No Risk Consumer Protection Plan**
We guarantee Northgate Computers to run any program written for IBM Computers. Return for 100% Refund if it fails in any compatibility test
Full Year Parts and Labor Warranty on Entire System!
You Can't Lose!

## Sold Only By Direct Marketing

## PHONE NOW 612 553-0320

NORTHGATE COMPUTER SYSTEMS
A DIVISION OF ABL INCORPORATED

Products Formerly Sold by Olla Computers

2905-Northwest Boulevard Suite 250
Plymouth, Minnesota 55441

MasterCard VISA COD

CIRCLE 234 ON READER SERVICE CARD

# California Digital

## 17700 Figueroa Street • Carson, California 90248

## FOUR PEN COLOR PLOTTER $159

**The manufacturer has asked us not to publish their name.** But this four color plotter was produced by one of the Worlds largest makers of computers. The 410 color plotter will connect to the **serial** port of virtually any microcomputer. Simple ASCII commands direct one of the four color pens to draw circles, arcs or ellipses on paper or transparency material up to 11 by 17 inches. The plotter is capable of producing the full upper and lower case alphabet along with seven international character sets. Text can be printed horizotal, vertical or diagonal in sizes from 1/16 to 6 inches.

Enlargements or reductions are achieved through elaborate firmware. Pen travel is four inches per second with .004" pen resolution. Standard pens are available in an assortment of 32 different colors and widths.

The ideal plotter for architecture, CAD engineering or graphic design. **At $595 it was a great buy, at $159 its a steal.** Support packages for specific computers available. Manual only $15 refundable upon purchase of plotter.

**OTHER PLOTTERS AVAILABLE:**
**Hewlett Packard • Houston Instruments • Roland**
**Sweet P • CalComp... please call for prices.**

$2495

## 80 Character Daisy Wheel Printer $759

These Fujitsu Daisy Max 830 were manufactured for Motorola's Computar Division. The purchase ordar was canceled and Fujitsu was forced to liquidate these 80 character per second daisy wheel pnnters at "fire sale" prices.

Features: bullat proof construction, serial RS-232 interface, Diablo 630 wheels and commands, programmable line spacing in increments of 1/96" and column spacing of 1/120". The pnnter is also capable of underscoring, bold ovarpnnt, shadow print, centers and justifies along with vector plotting.

Factory suggested price of the Daisy Max 830 was $2495, while supplies last California Digital is offering this liquidated special at only $759. Also availeble: tractor and sheat feeders.

## COLOR GRAPHICS TERMINAL $659

~~$3995~~

The Lear Siegler 7107 color graphics terminal is both DEC (VT-100 / VT-51) and Tektronix (4010/4014) compatible.
The terminal offers a palette of 4,096 colors with a resolution of 640 by 480 pixels on a 13 inch non-glare black screen.
Horizontal pan and image zoom, to 16 times original size, are standard features of this color graphics terminal.
The 7107 is the ideal terminal for CAD/CAM applications.

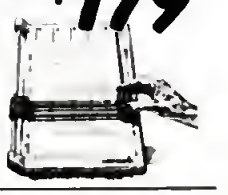
## NOW YOUR COMPUTER CAN READ!! $179

**Omni-Reader...** the first optical character reader **designed and priced for the amaii computer**

**COPY:**
•Manuscripts •Contracts •Articles
•Forms •Invoices

**APPLICATIONS:**
•Mailing Lists •Editing •Data Base Management •Transferring Information between incompatible systems

Uses a standard RS-232 serial port hookup to interface easily with your computer.

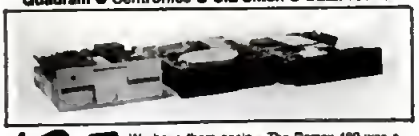


HEWLETT PACKARD

## LASER JET II $1895

New from Hewlett Packard the LaserJet Series II. More features than the LaserJet but at a much lower price.
Standard on the Series II is 512 K/byte memory expandable to 4 Megabytes, both serial and parallel ports. List price $2495 California Digital price $1895.
Memory upgrade, type fonts and toner cartridges available.

Other Laser Printers available:
**Taxas instruments • Okidata • Apple • Ricoh**
**Qume • AST Research • QMS • Xerox • Canon**
**Quadram • Centronics • CIE C.Itoh • DataProducts**



## Bernoulli Box $1595

was $3540 now only

The **Bernoulli Box** by Iomega, features 10 and 20 megabyte removable cartridges and delivers reliability, expandability, transportability, security and speed in one versatile subsystem. It lets you transfer megabytes of information safely and swiftly for primary or backup storage. Or combine several software programs onto a single cartridge for easy switching from one to another.

**Reliable...** the Box has incredible resistance to shock and vibration completely eliminating the possibity of head crash.

**Expandable...** grow at your own pace by adding inexpensive cartridges. When **security** is essential, don't lock up your system... just lock up the cartridges.

The Bernoulli Box delivers preformance that often exceeds the best of hard disk speed and the convenience of floppy disks. At these prices don't be caught wishing you had one after a loss of irreplacable data.

| | | List | Our Price |
|---|---|---|---|
| 10+10 Meg. | A2210H | $3450 | 1595 |
| 20+20 Meg. | A2220H | 4540 | 2095 |
| Bootable Controller | | 255 | 199 |
| 10 Meg. Cartridge | | 79 | 49 |
| 20 Meg. Cartridge | | 99 | 65 |

## 21 Megabyte Gold Card $479

Also available 3f Megabytes at only $559

**The fastest, lowest powered, longest warrantied, most durable, highest capacity, most reliable, lowest priced HARD-DISK-ON-A CARD available in the world today.**

• 58ms Access Time • Fastest Availability • Automatic Head Unlocking • Protects Heads and Media • 1K Sector Buffer • Increases System Throughput • High Reliability: 30,000 hr. MTBF No one else even close • 15.5 Watt Power Consumption • Lowest Available • 2 Year Warranty Longest Available

## $35 85 115

We have them again... The Remex 480 was a sell out two years ago but we located an additional 10,000 units and are offering these 2/3 height IBM/PC compatible 360K/Byte drives at only $35 each at quantity two.

The Mitsubishi 4851 was probably the best 360 K/Byte drive ever produced. The production cost was too high and Mitsubishi discontinued the product. Quantity two $85 each.

The Panasonic 475 is jumper selectable between 96 TPI format and 1.2 Megabyte as used in the IBM/AT computer.
Suggested price of the 475 is $189 but California Digital located a computer manufacturer that had to liquidate stock making available 1000 of these choice drives. Quantity two $115 each.

| | One | Two | Ten |
|---|---|---|---|
| **REMEX 480 ⅔ height for PC** | **39** | **35** | **call** |
| **MITSUBISHI 4851 360K/Byte** | **89** | **85** | **92** |
| **MITSUBISHI 4853 96 TPI.** | **99** | **95** | **92** |
| **MITSUBISHI new 501 half ht.** | **129** | **119** | **109** |
| **MITSUBISHI 504A AT comp.** | **169** | **159** | **155** |
| **TEAC FD55BV half height** | **109** | **96** | **99** |
| **TEAC FD55FV 96 TPI, half ht.** | **119** | **109** | **105** |
| **TEAC FD55GF for IBM AT** | **169** | **159** | **155** |
| **PANASONIC 455 Half Neight** | **109** | **99** | **89** |
| **PANASONIC 475 1.2 Meg./96** | **119** | **115** | **109** |
| **Switching power supply** | | | **49** |
| **Dual enclosure for 5¼" drives** | | | **59** |

## Smarteam 2400 Baud $289

The Smarteam 2400 offers all the features of the Hayes Smart Modem 2400 for a fraction of the price. Now is your opportunity to purchase a 2400 baud modem for only $289.
**Also available:** The Smarteam 1200 at only $139.

## U.S. Robotics 2400 Internal $189

The US Robotics Micro 2400 modem is one hundred percent Hayes compatible, auto dial, auto answer, auto everthing. A super value at only $189.

## $99

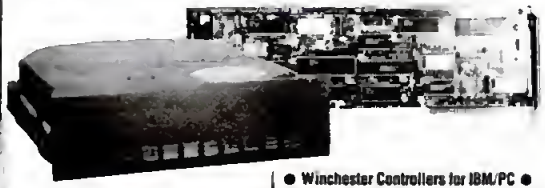
This 300/1200 baud modem matches design specs of Bell 212A and for all practical purpose those of the Hayes Smart Modem. The Avatex brings you reliable data transmission for only $99.

**OTHER MODEMS AVAILABLE**
Hayes • Universal Data • Fujitsu
Prometheus • Anchor • US Robotics

## SONY $139

The Sony 53W is a 3½ inch double sided double density disk drive. The drive can be connected to your existing floppy controller but will require MS/DOS 3.2 to properly operate in the PC and compatibles. The 53W is similar to the drive being used in the PC portable.

## Seagate 30 MEGABYTE WINCHESTER HARD DISK KIT $459



**Five Inch Winchester Disk Drives**

| | each | two+ |
|---|---|---|
| SEAGATE 225 20 Meg. ½ Ht. | 319 | 299 |
| SEAGATE 238 30 Meg. RLL | 369 | 359 |
| SEAGATE 4026 26 M. 35mS. | 659 | 629 |
| SEAGATE 4051 51 M. 35mS. | 759 | 739 |
| FUJITSU 2242 55 M. 35mS. | 1399 | 1329 |
| FUJITSU 2243 86 M. 35mS. | 1995 | 1919 |
| RODIME RO-202E 27 Meg. | 659 | 629 |
| RODIME RO-203E 40 Meg. | 995 | 959 |
| RODIME RO-204E 53 Meg. | 995 | 959 |
| CONTROL DATA 94155-86 M | 1929 | 1779 |
| MAXTOR XT1140 140 Meg. | 2595 | 2529 |
| TOSHIBA MK5679 M. 30mS. | 1789 | 1729 |
| TANDON 502 10 Meg. | 419 | 379 |

| | |
|---|---|
| **• Winchester Controllers for IBM/PC •** | |
| XEBEC 1220 with floppy controller | 229 |
| DTC 5150CX | 139 |
| OMTI 5520 half card | 129 |
| OMTI 5527 RLL controller | 159 |
| ADAPTEC 2070 RLL controller | 179 |
| ADAPTEC 2010A | 159 |
| WESTERN DIGITAL WD/1002WX2 | 119 |
| **• SCSI/SASI Winchester Controllers •** | |
| XEBEC 1410A 9¼" foot print | 219 |
| WESTERN DIGITAL 1002-05E 5¼" | 289 |
| OMTI 20L | 119 |
| **• Winchester Accessories •** | |
| Installation Kit with manual | 19 |
| Winchester enclosure and supply | 139 |
| Dual 20/34 cable set | 25 |
| Switching power supply | 49 |

**Shipping: First five pounds $3.00, each additional pound $.50.**
**Foreign orders: 10% shipping, excess will be refunded.**
**California residents add 6½% sales tax. • COD's discouraged.**
**Open accounts extanded to state supported educational institutions and companies with a strong "Dun & Bradstreet" rating.**

VISA

master charge

**TeleFax**
**(213) 217-1951**

**TOLL FREE ORDER LINE**
**(800) 421-5041**
**TECHNICAL & CALIFORNIA**
**(213) 217-0500**

CIRCLE 216 ON READER SERVICE CARD

# COMPUTER DISCOUNT WAREHOUSE

IBM

**IBM XT**
w/256K 1 DRIVE ..... $1038.90
w/256K 1 FLOPPY, 20 MEG ..... $1398.90
w/256K 1 FLOPPY, 30 MEG ..... $1554.90

**IBM AT**
w/256K 1.2 MEG FLOPPY ..... $2199.40
w/512K 30 MEG ..... $2989.64
Monitor & monitor adaptor card additional

# WHY PAY RETAIL?

## Nobody Sells For Less

COMPAQ™ PORTABLE

2 DRIVE 256K ..... $1543.69
1 DRIVE+ 1 20 MEG ..... $1949.90
PORTABLE II MODEL II ..... $2099.30
PORTABLE II MODEL IV ..... $3179.30

**286s • 386s • PORTABLE II & III • DESK PROs**
**ALL IN STOCK**
**CALL FOR LOWEST CUSTOM QUOTES**
TM—Registered trademark of IBM and COMPAQ

## HARDWARE, SOFTWARE & PERIPHERALS AT *DISCOUNT* PRICES

### COMPUTERS

**AST SPECIALS**

| | |
|---|---|
| AST Model 80 | $1556.80 |
| AST Model 90 | 1647.20 |
| AST Model 120 | 2328.48 |
| AST Model 140 | 2709.88 |
| AST Model 170 | 3049.90 |

**AT&T SPECIALS**

| | |
|---|---|
| AT&T 6300 w/128K 1 drive | $1298.81 |
| AT&T 6300 w/2S6K 2 drives | 1420.24 |
| AT&T 6300 w/256K 1 floppy, 20 Meg | 1549.23 |
| AT&T 6300 w/256K 1 floppy, 30 Meg | 1698.14 |

All AT&Ts include monitor, keyboard and DOS

**Panasonic BUSINESS PARTNER SPECIALS**

| | |
|---|---|
| PANASONIC FX-600F1 | $789.90 |
| PANASONIC FX-600HD20 20 Meg | 1219.75 |
| PANASONIC FX-600F1 AT compatible | 1499.60 |
| PANASONIC FX-600HD30 30 Meg | 2149.20 |

**TOSHIBA SPECIALS**

| | |
|---|---|
| TOSHIBA 1100 Plus | $1484.10 |
| TOSHIBA 3100 | 2778.95 |

**SHARP SPECIALS**

| | |
|---|---|
| SHARP 7000A | $1340.42 |
| SHARP 7100 AT compatible | 1986.70 |

**WYSE PC/AT SPECIALS**

| | |
|---|---|
| WYSE PC 1 drive | $849.68 |
| WYSE 2200-01 AT compatible | 1349.77 |
| WYSE 2200-20 AT compatible | 1775.20 |
| WYSE 2200-40 AT compatible | 2269.40 |

**COMPAQ™ SPECIALS**

| | |
|---|---|
| COMPAQ portable w/256K 2 floppies | $1543.69 |
| COMPAQ portable w/256K, 20 Meg | 1949.90 |
| COMPAQ DeskPro w/128K 1 floppy | 1299.99 |
| COMPAQ DeskPro w/256K 2 floppies | 1354.26 |
| COMPAQ DeskPro w/640K 20 Meg hard drive | 1899.90 |
| COMPAQ DeskPro w/640K 30 Meg | 2189.50 |
| COMPAQ Portable II Model II | 2099.30 |
| COMPAQ Portable II Model IV | 3179.30 |
| COMPAQ Portable III 20 Meg | NEW MODEL |
| COMPAQ Portable III 40 Meg | Call for Price |
| COMPAQ "286" DeskPro, 256K 1 floppy | SAVE |
| COMPAQ "286" DeskPro w/30 Meg | CALL |
| COMPAQ "286" Portable 640K, 20M | CALL |
| COMPAQ "386" DeskPro 40 Meg | 4679.28 |
| COMPAQ "386" DeskPro 70 Meg | 5255.28 |
| COMPAQ "386" DeskPro 130 Meg | 6335.82 |

**IBM XT™ SPECIALS**

| | |
|---|---|
| IBM XT w/256K 1 drive | $1038.90 |
| IBM XT w/256K 2 drives | 1153.90 |
| IBM XT w/256K 1 floppy and 20 Meg | 1398.90 |
| IBM XT w/256K 1 floppy and 30 Meg | 1554.90 |
| IBM XT w/256K 1 floppy and 49 Meg | 1679.90 |
| IBM XT Model 286 1 floppy and 20 Meg | IN STOCK |

**IBM AT™ SPECIALS**

| | |
|---|---|
| IBM AT w/256K 1.2 Meg floppy | $2199.40 |
| IBM AT w/512K 30 Meg hard drive | 2989.64 |
| IBM AT w/512K 40 Meg hard drive | 3098.55 |
| IBM AT w/612K 70 Meg hard drive | 3459.95 |
| IBM AT Model 339 | 3995.95 |

Other Computers Available Upon Request

### PLOTTERS & DIGITIZERS

| | |
|---|---|
| HEWLETT PACKARD HP7440A | SAVE |
| HEWLETT PACKARD HP7475A | IN STOCK |
| HOUSTON INSTRUMENTS DMP-42 | 2455.93 |
| HOUSTON INSTRUMENTS DMP-52 | 3456.93 |
| HOUSTON INSTRUMENTS DMP-52MP | 3887.70 |
| HOUSTON INSTRUMENTS DMP-56 | 4389.43 |
| HOUSTON INSTRUMENTS TG-1011 | 508.70 |
| HOUSTON INSTRUMENTS TG-1017 | 818.31 |
| HOUSTON INSTRUMENTS TG-8011 | 629.10 |
| HOUSTON INSTRUMENTS TG-8017 | 1250.92 |
| HOUSTON INSTRUMENTS TG-8024 | 2207.38 |
| HOUSTON INSTRUMENTS TG-8036 | 2978.80 |
| SUMMASKETCH | 379.65 |

### DRIVES FOR ATs & 286s

| | |
|---|---|
| MINISCRIBE 40 Meg 29ms | $649.75 |
| MINISCRIBE 80 Meg 28ms | 895.45 |
| PRIAM 40 Meg hard disk | 599.55 |
| PRIAM 60 Meg hard disk | 647.95 |
| PRIAM 130 Meg hard disk | 2240.40 |
| SEAGATE 4038 30 Meg hard disk | 559.60 |
| SEAGATE 4051 40 Meg hard disk | 649.80 |
| SEAGATE 4096 80 Meg hard disk | 959.59 |
| 360K floppy drive | 110.12 |

### PRINTERS

| | |
|---|---|
| CITIZEN 120D | $188.55 |
| CITIZEN MSP10/MSP20 | 275.20/334.92 |
| DICONIX Printer by Kodak | 366.17 |
| EPSON LX 86 80 Col 100 CPS NLQ STD | 199.99 |

**EPSON SPECIALS FOR THE MONTH**
**EPSON LQ800/LQ1000 — 499.22/599.55**

| | |
|---|---|
| EPSON FX 86 | 379.74 |
| EPSON FX 286E | 539.16 |
| EPSON EX 800/EX 1000 | 449.10/598.00 |
| EPSON LQ 2500 | 1918.44 |
| EPSON COMREX 420i 132 Col. 420 CPS | 699.00 |
| IBM Pro Printer | 399.70 |
| IBM Pro Printer KL | 542.67 |
| NEC Color P6/Color P7 | 539.74/709.12 |
| NEC elf 350 | 387.66 |
| NEC P6 80 col | 449.22 |
| NEC P7 136 col 216 cps | 915.35 |
| NEC P5 136 col 290 cps | 999.97 |
| NEC P5XL | 1027.52 |
| NEC P9XL | 1169.28 |
| NEC 3550 Spinwriter | 797.12 |
| NEC 8850 Spinwriter | 1097.79 |
| OKI okimate 20 | 117.72 |
| OKI ML 182P/182S | 234.50/276.10 |
| OKI ML 192 Plus/193 Plus | 344.80/519.40 |
| OKI ML 292 Plus/293 Plus | 424.44/547.55 |
| PANASONIC 1080i | 219.19 |
| PANASONIC 1091i | 284.80 |
| PANASONIC 1092i | 359.40 |
| PANASONIC 1592 | 433.44 |
| PANASONIC 1595 | 517.44 |
| PANASONIC 3131 | 264.32 |
| PANASONIC 3151 | 409.52 |
| TOSHIBA P321 | 468.25 |
| TOSHIBA P341E | 589.66 |
| TOSHIBA P351 S/P Model 2 | 979.99 |

### LASER PRINTERS

| | |
|---|---|
| AST Laser Printer | $3245.40 |
| CORONA Laser Printer | 1995.90 |
| N-P Laser Jet Model 2 | IN STOCK |
| H-P Laser Jet 500 Plus | NEW MODEL |
| DUAD Laser LS1101 | NEW MODEL |

### FLOPPIES, DRIVES & TAPES

| | |
|---|---|
| 1/2 height floppy drive | $99.00 |
| IBM Logo Full Height Drive | 109.73 |
| MINISCRIBE 20 Meg 1/2 height w/cont | 339.14 |
| MINISCRIBE 30 Meg 1/2 height w/RLL | 399.95 |
| SEAGATE 20 Meg 1/2 height hard drive | 349.90 |
| SEAGATE 30 Meg full height w/controller | 649.00 |
| SEAGATE 39 Meg 1/2 height w/RLL | 429.72 |
| GENOA 20 Meg tetereal tape | 574.85 |
| GENOA 20 Meg external tape | 636.02 |
| GENOA 60 Meg internal tape | 734.60 |
| GENOA 60 Meg external tape | 995.10 |
| IOMEGA BERNOULLI 10+10 | New Lower Price |
| IDMEGA BERNOULLI 20+20 | New Lower Price |
| IRWIN 10 Meg tape backup | 349.34 |
| IRWIN 20 M/40 M Internal Tape | SAVE |
| TALLGRASS 20 Meg Internal Tape | 397.40 |
| TALLGRASS 20 Meg External Tape | 592.97 |

### DRIVE CARDS

| | |
|---|---|
| MINISCRIBE 30 Meg Flashcard | $469.96 |
| MAYNARD 20 Meg | 575.40 |
| MOUNTAIN 20 Meg/30 Meg | 519.50/589.50 |
| PLUS DEVELOPMENT 20 Meg | 649.40 |
| WESTERN DIGITAL 20 Meg/30 Meg | CALL |

### INTERFACE CARDS & MULTI-FUNCTION CARDS

| | |
|---|---|
| APPARAT 64/384K w/Clock | $99.99 |
| AST 6 pack with 64K C/S/P expands to 384K | 166.24 |
| AST Premium 6 pack S12K | 364.25 |
| AST Premium Advantage for AT | 448.48 |
| AST Advantage for AT | 345.00 |
| INTEL PC Aboveboard for w/64K | 249.60 |
| INTEL PC Aboveboard with par & ser | 279.60 |
| INTEL AT Aboveboard w/128K | 360.24 |
| INTEL AT Aboveboard with par & ser | 398.60 |
| LASER I/O w/par. ser. game clock, 384K | 99.99 |
| ORCHID Tiny Turbo | 399.45 |
| ORCHID 386 Accal | 888.88 |
| QUAD AT expands to 2 Meg | 325.43 |
| QUADRAM Silver Quad expands to 384K 1 par., 2 ser., 1 game clock w/OK | 139.60 |

### MONOCHROME MONITORS

| | |
|---|---|
| AMDEK 310A/410A | $139.99/154.95 |
| AMDEK 1280 | 687.78 |
| COMPAQ monochrome monitor | 188.46 |
| IBM monochrome monitor | 219.84 |
| PGS MAX 12E amber color | 167.40 |
| PACKARD BELL Green or Amber | 89.95 |
| TAKAN 123 Green/124 Amber | 119.50/124.05 |
| VIKING 1 Monitor | $1849.65 |

### MONITOR INTERFACE CARDS

| | |
|---|---|
| PACKARD BELL color card w/p | $ 99.00 |
| PACKARD BELL monographics card w/p | 99.00 |
| GENOA Spectrum (color monographic w/p) | 168.75 |
| HERCULES color card w/p | 144.15 |
| HERCULES monographics plus w/p | 179.84 |
| STB CHAUFFEUR HT w/p | 199.60 |
| TAXAN MONOGRAPHIC w/p | 99.00 |

### COLOR GRAPHIC MONITORS

| | |
|---|---|
| AMDEK color 600 (Hi-Res RGB) | $399.97 |
| AMDEK color 722 | 459.49 |
| IBM color monitor | 528.77 |
| MAGNAVOX 14" RGB 640 x 200 | 289.00 |
| PGS HK 12 Hi-Resolution RGB | 412.32 |
| PGS LM 300 | 499.70 |
| TAXAN 635/650 | 397.90/469.90 |
| TAXAN 720 | 386.24 |

### ENHANCED GRAPHICS MONITORS

| | |
|---|---|
| COMPAQ enhanced graphics monitor | $584.14 |
| IBM enhanced graphics monitor | 679.41 |
| NEC Multisync | 577.67 |
| NEC APC-IV Color Monitor | 559.70 |
| PGS HX 12E Hi-Resolution RGB | 488.32 |
| SONY MULTISCAN | SAVE |
| TAXAN 760 New EGA Model | 477.00 |
| TAXAN 770U | 539.49 |

### ENHANCED GRAPHICS ADAPTER CARDS

| | |
|---|---|
| GENOA Spectra EGA 256K w/p | 294.60 |
| IBM Enhanced Graphics Adapter | 398.98 |
| NEC G9 1 640x480 | 334.43 |
| PARADISE Auto Switch EGA | 339.10 |
| QUADRAM EGA Card | 319.19 |
| QUAD Prosync | 359.90 |
| ORCHID EGA Card | 329.94 |
| SCOA Star EGA | 219.50 |
| TAXAN Auto Switch EGA Card | 299.99 |
| VIDEO 7 Vega Deluxe | 369.90 |

### MODEMS, COMMUNICATIONS & EMULATIONS

| | |
|---|---|
| ASI 1200B (Hayes Compat.) | $114.19 |
| AST 5251-11 Plus/5251-12 | 639.04/508.60 |
| EVEREX 1200B | 109.90 |
| EVEREX 2400B | 199.50 |
| HAYES Transet 1000, 128K | 274.10 |
| HAYES 1200/1200B | 382.08/299.03 |
| HAYES 2400 | 575.00 |
| HAYES 2400B | 499.19 |
| IRMA 3278/79 Courier | 595.17 |
| SCOA Starcom 1200B | 104.95 |
| US ROBOTICS All Models | SAVE |
| VENTEL All Models | SAVE |

### CHIPS

| | |
|---|---|
| 4164 (64K) 9 chip set | $9.98 |
| 128K piggy backs for AT | 4.94 |
| Nine Chip Set (complete set) | 34.50 |
| 8087-2 (for COMPAQ DeskPro) | 154.33 |
| 8087-3 (for PC/XT/COMPAQ portable) | 121.50 |
| 80287-6 (for AT and AT Compatible) | 168.30 |
| 80287-8/80287-10 | 297.55/336.25 |
| 41256K (256K) 9 chip set | 28.12 |
| COMPAQ 386 1 Meg upgrade | 229.53 |

### MISC. & ACCESSORIES

| | |
|---|---|
| A-B Switching Box (par. or serial) | $45.00 |
| BASF D/S, D/D | 12.50 |
| BASF 3.5" Disk for MACINTOSH S pack | 17.99 |
| BASF Disks for AT (1.2 Meg) | 26.14 |
| KENSINGTON Masterpiece | 99.99 |
| KENSINGTON Masterpiece Plus | 118.40 |
| KENSINGTON Masterpiece Remote | 117.95 |
| KEYTRONICS S150 | 99.00 |
| KEYTRONICS 5151 PC or AT&T | 162.00 |
| PERMA POWER 6 Outlet Surge Suppressor | 29.40 |
| DUADRAM Micro Fazers | 140.40 |
| Printer Cable (IBM to Centronics) 6 ft | 19.99 |
| SCOA Surge Guard | 89.65 |
| XT Power Supply 150 Watt | 79.40 |

### MICE

| | |
|---|---|
| LOGITECH Logimouse Bus Version | $109.06 |
| LOGITECH Logimouse C7 | 99.95 |
| MICROSOFT Mouse (Bus Version) | 119.34 |
| MICROSOFT Mouse (Serial Version) | 131.28 |
| MOUSE SYSTEMS (Serial Version) | 108.55 |
| MOUSE SYSTEMS (Bus Version) | 116.77 |
| TORRINGTON Manager Mouse | 98.67 |

**MOST ORDERS SHIPPED WITHIN 48 HOURS.**

**Call CDW for custom quotes on products not listed.**

**If you find a better price call us before you buy.**

## WHY WAIT? CALL COMPUTER DISCOUNT WAREHOUSE NOW!

| | |
|---|---|
| dBase III+ | $399.00 |
| Lotus 1-2-3 | $305.00 |
| Paradox | $399.00 |
| Word Perfect | $199.99 |

# 1-(800) 233-4426

CIRCLE 109 ON READER SERVICE CARD

In Illinois (312) 498-1426

FAX (312) 291-1737

MasterCard VISA American Express Card

**HIGH VOLUME BIDS INVITED**
P.O. BOX 3048
Northbrook IL
60065

CDW 587 PC

On all hard drive orders and orders under $200.00 please add $5.00 handling fee. All prices reflect 3% discount for cash. Allow 10 business days for shipping when paying by personal check. Software, chips and other electronic components are not returnable. Non defective returns are subject to a restocking charge. All prices subject to change.

# THE CCI/AMERICAN MADE 80386

FULL ONE YEAR WARRANTY
30 DAY MONEY BACK GUARANTEE*

**This Powerhouse Includes:**

- *Intel 32 bit 80386, at 14.2 MHz*
- *640K RAM and 1.2 Meg floppy*
- *Built in serial and parallel ports*
- *Full 101 key enhanced keyboard*
- *3-eight bit, 3-sixteen bit and 1-thirty two bit expansion slot*
- *Optional high-speed 80287*
- *Norton Rating average 18.4*

# JUST $3195

## 12 MHz - 80286 Mother Board

- Standard with 12 MHz Intel 80286
- Optional upgrade to Intel 80386
- Up to 640K RAM on mother board
- Clock-calendar with battery back-up
- Enhanced set-up & diagnostic software and all documentation
- Fits XT and AT cases and accepts all AT and XT expansion boards
- Compatible with software written for the IBM PC, PC/XT and PC/AT
- Immediate delivery, made in U.S.A.
- 1 year warranty against defects

**Only $1295**
**80386 Upgrade-Only $800**

## Hard Disks

**20 Meg Seagate kit / XT** **$445**
Western Digital controller, software, mounting hardware, and cables

**30 Meg Seagate kit / XT** **$505**
RLL controller, software, mounting hardware, and cables

**20 Meg Seagate for AT** **$569**
40 MS voice coil, cables, and rails

**30 Meg Seagate for AT** **$675**
40 MS voice coil, cables, and rails

**40 Meg Seagate for AT** **$799**
40 MS voice coil, cables, and rails

**60 Meg PRIAM for AT** **$1475**
28 MS voice coil, cablas, and rails

**72 Meg Toshiba for AT** **$1695**
23 MS voice coil, cables, and rails

## The CCI ST/286-10 10 MHz "AT"

- Mother board with Intel 80286
- 640K of RAM, 1.2 Meg floppy
- Full 101 key, enhanced keyboard
- 192 watt power supply
- Clock-calandar with battery back-up
- Enhanced set-up and diagnostic software and all documentation
- Western Digital controller card

**Only $1495**
**80386 Upgrade Available**

****12 MHz Version**
**Only $2395**
Call for info and specifications

*Computer Classifieds, Inc. 17830 State Road 9, Miami, Florida 33162 Telex 510-600-7725* CIRCLE 297 ON READER SERVICE CARD

# THE CCI/80386

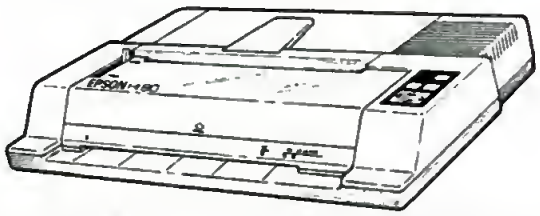
**Call Today (800) 331-5150**
**In FL Call (305) 651-5853 - Support Line (305) 651-0073**

No charge for UPS ground shipping. No surcharge for MasterCard or Visa. Florida residants add 5 percent sales tax. ***30-Day Guarantee**-Any item bought from Computer Classifieds, Inc. at the listed discount prices may be returned within 30 days from tha date it was shipped for a full refund of your purchase price. All original packing material and all documentation must be returned in new condition, must be shipped prapaid and insured, and must bear a Computer Classifieds Inc. Credit Return Authorization (CRA) on the shipping label. Warranty returns require RMA number and proof of purchase. Prices and specifications subject to changa without notice. IBM, PC, IBM XT, IBM AT are trademarks of IBM Corporation. Quantities may be limitad, items may be substituted.

# EPSON PLOTTER
## FOUR PEN/FOUR COLOR

# $198

LIST PRICE $599



| | |
|---|---|
| 4 weterbase pens | $5 |
| 4 oil bese pens | $5 |
| 100 sheets coated paper | $5 |
| 10 sheets overhead trensperency film | $6 |
| Top rated business graphics software peckege for PC | $29 |
| Pereliel PC ceble | $19 |

PC MAGAZINE

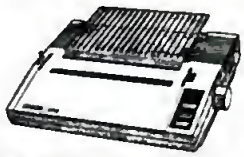
"The Epson HI-80 is the final choice. It makes a name for itself at the low end of the price scale ($599) and the top end of the performance scale."
PC MAGAZINE

- Fest - 9 inch per second
- Accurete - .1 mm step size
- Four Pen/Four Color
- Autometic Pen Capping
- Standerd Pereliel Interfecing
- Accepts Peper or Trensparencies
- One Yeer Epson Werrenty

## EPSON PRINTER

# $199

LIST PRICE $299



TRACTOR OR SHEET FEEDER $29

LX-86, FX-86e/286e, EX-800/1000, LO-800/1000/2600
IN STOCK, CALL FOR LOW LOW PRICES

## EGA PACKAGE

# $599

LIST PRICE $998

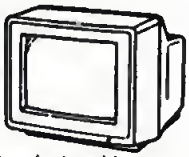
Hi-res EGA video card...$239
Hi-res EGA monitor...$399

- Dual Mode Monitor
- Non-glere .31 mm Dot Pitch
- 640 x 350, 640 x 200
- EGA, CGA, MDA & HGA
- 100% IBM Competible
- 256K of Video RAM

## HI-RES RGB MONITOR

# $269

LIST PRICE $699



- 640 x 240 Non-glare Tube
- 16 color, .39 mm Dot Pitch
- Includes Free Ceble

Manufactured by Hitachi, Samsung or Cesper

## HARD DISK ON A CARD

21 MB CARD

# $398

30 MB CARD

# $498

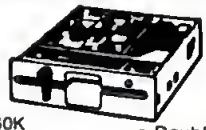
- 21.3 MB Formatted
- Lowpower
- Head Park Zone
- Pleted Media
- Light 2.4 Lbs

## 360K DISK DRIVE

Built By Alpine Electronics to IBM Specifications, same as Oume 142

# $69.95

LIST PRICE $199



10-99 $65.00
100+ $61.50

- 360K
- 48 TPI
- Double-sided
- Double density
- Half Height

## OPTI-MOUSE

The Beat Mouse For Your PC!

# $99

LIST PRICE $220

## DR. HALO II

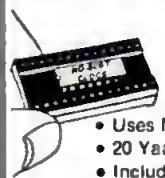
The #1 Renked Free-Hend Grephics Softwere Peckege

# $9

With Purchase of Optimouse

## NO-SLOT CLOCK

For Your PC-XT (Clone) or Apple



# $49

- Uses No Slot
- 20 Yaar Battary
- Includes Softwere

**Plug-in Clock Board for PC...$49**

## MICROSOFT MS-DOS 3.20

# $88

Including GW-BASIC
Supports 3½" Drive

## 3½" DISK DRIVE FOR YOUR PC/XT/AT

# $149

720K Disk Drive For Mass Storage or for Down Loeding to your Lap-Top Computer
Requires DOS 3.20

## 1200 BAUD DELUXE MODEM

YOUR CHOICE

# $128

INTERNAL OR EXTERNAL

# JADE COMPUTER

PLACE ORDERS TOLL FREE!
Continental U.S.A. (800)421-5500
Inside California (800)262-1710

4901 W. Rosecrans Ave. Box 5046
Hawthorne, CA 90251-5046

VISA MasterCard

**Prices at our six store locations will be higher.**
**We eccept cesh, checks, credit cerds or purchese orders from quelified firms end institutions. Minimum prepaid order $15.00.**

Ca & Tx residents add sales tax **Prices & evellability subject to chenge without notice.** Shipping & handling chargas vie UPS Ground 50¢/lb UPS Air $1.00/lb **Minimum cherge $3.00.**

CIRCLE 243 ON READER SERVICE CARD

SAVE UP TO 70% SEE SOFTWARE

# CAD & PRINTERS

SINCE 1984

**NEC MULTISYNC $549**

**MODEM SMART ONE 1200B $109**

**SEAGATE ST225 20 Meg w/Card $349**

**GENERIC CADD $55**

**DRAFIX 1 w/DOT PLOT $199**

**PERSPECTIVE 3D Graphics $149**

**WORD PERFECT $192**

**dBASE III + $392**

**MULTI-SCAN w/EGA Autocard $699**

### LASER PRINTERS

| | |
|---|---|
| CIE, CITIZEN, CORDATA, HEWLETT-PACKARD CANNON, OASYS, OMS | $CALL |

### PRINTERS

| | |
|---|---|
| **CITIZEN** | |
| 120D | $172 |
| MSP-10 | $259 |
| MSP-15 | $355 |
| MSP-20 | $295 |
| MSP 25 | $445 |
| PREMIERE 35 | $439 |
| TRIBUTE 224 | $CALL |
| **EPSON** | $CALL |
| **FIJITSU** | $CALL |
| **JOL** | See Plotters |
| **NEC** | |
| P5 | $942 |
| P7 | $959 |
| **PANASONIC** | $CALL |
| **STAR MICRONICS** | $CALL |
| **TOSHIBA** | |
| 321 | $449 |
| 351 II | $959 |

### CHIPS

| | |
|---|---|
| 64K 256K 8087 80287 | $CALL |

### MONITORS & TERMINALS

**TEKNIKA MULTI-SCAN $489**

| | |
|---|---|
| **AMDEK** | $CALL |
| **GOLOSTAR** | |
| TTL | $70 |
| RGB | $229 |
| RGB HI-RES | $269 |
| **HITACHI** | $CALL |
| **MITSUBISHI** | |
| DIAMOND SCAN | $CALL |
| OTHERS | $CALL |
| **NEC** Multisync | $549 |
| **SIGMA OESIGNS** | |
| 15 1664 1200 w/card | $1590 |
| 19 w/card | $1890 |
| **SONY** Multiscan | $CALL |
| **TAXAN** | $CALL |
| **VERTICOM** | |
| CD-5 | $1998 |
| OTHERS | $CALL |
| **VMI** | $CALL |
| **WYSE** | |
| 30 | $290 |
| 50 | $360 |
| 75 | $559 |
| 85 | $459 |
| 700 | $679 |
| OTHERS | $CALL |

### AUTOCAD SOFTWARE

Tutorials Add-Ons for Arch Eng Construction Civil Piping Mapping etc. ADE-3 $CALL

### SOFTWARE

| | |
|---|---|
| **500+ Others** | $CALL |
| **ACAD** | $CALL |
| CPA+ for Lotus 123 | $289 |
| Clipper | $CALL |
| dBase III+ | $389 |
| Draflx 1 w/dot (ltd qty.) | $199 |
| Dr Heloll (ltd qty) | $25 |
| EasyCAD | $CALL |
| Eneble 2.0 | $311 |
| Fremework II | $CALL |
| Generic CADO | $55 |
| Herverd Presentielion Grephics | $194 |
| Harvard Profesolonel Publisher | $CALL |
| Lotus 123 | $329 |
| Peredos | $CALL |
| PathMinder (PC Choice) | $39 |
| Perspective (free upgrede) | $149 |
| PFS First Choics | $89 |
| PFS. Professionel File | $119 |
| PFS Profesolonal Plan | $119 |
| R:Base 5000 Sys V | $349 |
| Word Perfect 4.2 | $192 |

### CAD - DIGITIZERS & PLOTTERS

| | |
|---|---|
| **CALCOMP** | |
| 1041 GT | $CALL |
| 1043 GT | $6999 |
| DIGITIZERS | $CALL |
| **ENTER** | |
| SWEET-P 600 | $659 |
| 1000 | $2690 |
| 1200 | $2998 |
| **OTCO** | $CALL |
| **HOUSTON** | |
| OMP 41/42 | $2377 |
| OMP 51/52 | $3427 |
| OMP 56A | $4325 |
| MP Options | $CALL |
| **HITACHI** | |
| TIGER 1111C | $469 |
| TIGER 1117 | $CALL |
| OTHERS | $CALL |
| **HP PLOTTERS** | $CALL |
| **IOLINE** | $CALL |
| **JOL 850** | $CALL |
| **MITSUBISHI** DIGITIZERS | |
| Grafnet 01 8 - 12 | $260 |
| Grafnet 02 13 - 16 | $392 |
| **NICOLET-BRUNING** | |
| 900 A/E (fast') | $6500 |
| **OPTICAL** | $CALL |
| **SCRIPTEL DIGITIZERS** | |
| SPC 1212 (5 emulations) | $349 |
| OTHERS | $CALL |
| **SUMMAGRAPHICS** | |
| SUMMA 12 12 MM1201 | $349 |
| OTHERS | $CALL |

### COMPUTERS

**TOSHIBA T-1100+ $1399**

| | |
|---|---|
| **AT-286/10** | $1099 |
| **AST 286** | $CALL |
| **COMPAC** | $CALL |
| **COROATA** | $CALL |
| **IBM** | $CALL |
| **NEC** MULTISPEED | $1450 |
| **SPERRY IT (AT)** ENHANCED 44 MEG | $1659 |
| **TOSHIBA** | |
| T1100- | $1399 |
| T3100 (ltd qty) | $2790 |
| **WYSE** 286 | $1699 |

### CARDS/BOARDS

**HERCULES GRAPHICS PLUS $175**

| | |
|---|---|
| **ARTIST** | $CALL |
| **ARISTOCAOS** | $CALL |
| **ATI** | |
| ORAPHICS SOLUTION$ | $179 |
| EGA WONOER | $CALL |
| **INTEL** | |
| ABOVE BOARO AT | $319 |
| ABOVE BOARO P$/AT | $359 |
| **NEC** GB 1 | $369 |
| **NUMBER 9** | $CALL |
| **PARADISE** | |
| EGA AUTOSWITCH (560 Model) | $279 |
| EGA AUTOSWITCH | $299 |
| EGA AUTO$WITCH 480 | $379 |
| **PHOTON** | $CALL |
| **SIGMA DESIGNS** | |
| EGA 350 AUTOCARD | $199 |
| EGA 480 AUTOCARD | $289 |
| COLOR 400 (non-interlace) | $299 |
| **VERTICOM** | $CALL |
| **VIDEO 7** | |
| VEGA DELUXE | $323 |
| OTHERS | $CALL |

### DISK DRIVES

| | |
|---|---|
| **SEAGATE** | |
| ST225 20 w/WO CARO | $349 |
| ST238 30 w/CARD | $409 |
| **FIJITSU** 360K Floppy | $85 |

### MICE & ACCESSORIES

| | |
|---|---|
| **Economouse (MS comp)** | $69 |
| **LogiTech** | |
| Logimouse C7 Plus | $84 |
| Logimouse Bus | $99 |
| **MicroSoft Mouse** w/Paint | $118 |
| **PC Mouse/Optimouse** w/Halo II | $98 |
| **Tilt & Swivel Stand** | $29 |
| **Mesterpsecs Director** | $79 |

Micro Computer Accessories / Curtis Book Ease • Dust Covers • Printer Stands • Monitor Tilt & Turn Stand • Keyboard Trays • CPU Vertical Stands • CRT Valet • Master Piece • CPU Security Locks • Static Mats • Storage Files • Printwheels • Ribbons • Diskettes • Cables

**M.H.I. WAREHOUSE**
5021 N 20th Street #10261
Phoenix, AZ 85064
TOLL FREE with order
**602-995-1134**
Hours 8 - 5 MT M-F 9-2 SAT

Prices reflect cash discount and are subject to change without notice. Compatibility of products not guaranteed. All returns are subject to a restocking charge. Purchase orders are welcome and C.O.D.s are subject to 2% plus shipping.

## EPSON EQUITY and CORDATA BEST VALUES!

### CORDATA PORTABLE PC

**$879 Complete!**

*From Makers of Leading Edge D!*

512K RAM, DOS
1 FDD, Keybrd
600 x 400 Graphics

• *Free Electric Desk Software* •

| | |
|---|---|
| *Cordata Portable: 2 Disk Drives* | $979 |
| Cordata Portable: 20M HD, 1FDD | $1,249 |
| Cordata Portable: 30M HD, 1FDD | $1,349 |

### EPSON EQUITY II

**$1,049 Complete!**

640 KB RAM
1 FDD, Keybrd
DOS, Basic
1 Year Warranty
Fast V30 CPU, 4/7 MHz

| | |
|---|---|
| Equity II: 1 FDD, Hi Res Monitor | $1,149 |
| Equity II: 20MB HD, 1 FDD, HI Res Mtr | $1,479 |
| Equity II: 30MB HD, 1 FDD, HI Res Mtr | $1,579 |
| Equity I: 1 FDD | $699 |
| Equity I: 2 FDD, HI Res Monitor | $999 |
| Equity I: 20MB HD, 1 FDD, Monitor | $1,195 |
| Equity I: 30MB HD, 1 FDD, Monitor | $1,295 |
| Equity III+: 10 MHz 80286, New | Call |
| GQ3500 Laser Printer | $1,799 |

** Note: Epson prices MAY GO DOWN, please call **

### NEW CORDATA AT CS4200

**$1,295**

80286, 8 MHz
1.2M/360K FDD
640K, Clock
Keybrd
DOS, Basic

| | |
|---|---|
| CS4200: 1.2M FDD, Mntr | $1,399 |
| CS4200: 20M HD, 1.2M FDD, Mntr | $1,749 |
| CS4200: 30M HD, 1.2M FDD, Mntr | $1,849 |

### 30M HARD DISK CARD

**$479**

**FACTORY MADE**
**12 Month Warranty!**
Software Included!
Drive used by IBM!

| | |
|---|---|
| 20M Hard Disk Drive, Controller | $349 |
| 20M Hard Disk Card | $399 |
| 30M Hard Disk Drive, Controller | $399 |
| 1200B Everex Modem | $125 |
| 384K Mem Brd, w/Clock, Chips | $129 |

## GREAT LAKES
### *Microcomputer Sales*

Prices reflect cash discount and are subject to change. Add 2% for C.O.D., MC, or VISA. Returns must be preapproved. Address: 6920 S. Cedar, Lansing, MI 48911. All products are new and include any warranties supplied by manufacturer.

Hours: MON - FRI 8 am to 8 pm
SAT 9 am to 3 pm EST

**1-800-832-0123**

**In Michigan:.1-517-694-8892**

CIRCLE 375 ON READER SERVICE CARD

CIRCLE 387 ON READER SERVICE CARD

# GET THE MAIL ORDER MONKEY OFF YOUR BACK.

## *NEW!* CCC-386c

**$2995.00** 16 MHz, 1 MB RAM, 1.2 MB Floppy, Keyboard.
(4 times faster than AT.)
40 MB Hard Disk Option ..... $799.00

## *NEW!* CCC Portable XTc

**$999.00** 256K RAM, Two 360K drives, Built-in 9" TTL or composite monitor, Video Card, Keyboard.
20 MB Hard Disk Option ..... $299.00

## FREE SOFTWARE with all systems ✦ Shipped Within 72 Hours

**CCC-XTc $999.00**
30 MB Seagate Hard Disk, 360K Fujitsu Floppy Drive, 4.77 or 8 MHz CPU speed, Keyboard, TTL Monitor and Video Card.
Color Option w/Monitor & Card—$299.00

**CCC-SOFTPAK—*FREE*** w/ system. Includes Word Processor, Spreadsheet, Database, Telecommunications, Games. (Limited offer while supply lasts.)

**PFS: 1st Choice** ..... $99.00
**VP Planner** ..... $69.00
**Norton Utilities** ..... $69.00
**Managing Your Money** .. $109.00

**US Robotics INTERNAL MODEMS**
Auto Adjustable / Auto Answer
1200 Baud..... $99.00
2400 Baud.... $199.00

**CCC-EXTERNAL MODEMS**
Auto Adjustable / Auto Answer
1200 Baud..... $99.00
2400 Baud.... $249.00

**GUARANTEES/WARRANTIES**
All CCC Hardware is Warrantied for 1 Year, 30-Day Money Back Guarantee for Mail Orders (15 Days for Walk-ins). All systems are fully assembled, tested & burned in.

**CCC-ATc $1999.00**
30 MB Hard Disk (35MS), 1.2 MB Floppy Drive, 6 or 10 MHz CPU speed, Keyboard, TTL Monitor & Video Card, 1 Parallel & 1 Serial port.
EGA Option w/Monitor & Card—$599.00

**FREE CATALOG**
**FREE MEMBERSHIP**

**DYNAX 2010**
200 CPS, 10" Carriage ..... $369.00

**DYNAX 2015**
200 CPS, 15"Carriage..... $449.00

**50 D/S D/D DISKETTES**
Plus FREE 60 Capacity Data Case, Labels & W/P Tabs ..... $29.99

**ALL MAJOR SOFTWARE**
Over 300 names in top quality, most needed software, at substantial discounts.

**IBM-XT™ $1699.00**
256K, 1,360K Drive, 20 MB Hard Disk

**COMPAQ 386™ $5199.00**
1.2 MB Floppy, 40 MB Hard Disk

**SPERRY IT™ $2999.00**
1.2 MB Floppy, 40 MB Hard Disk

**✦ SPECIALS ✦**

**EGA Monitor** .... $439.00
**EGA Short Card** .. $199.00
**Color Monitor** ... $299.00
**2 MB EMS XT** ..... $99.00
**Monographics/Parallel Card** ..... $69.00
**30 MB Kit** ..... $429.00
**Toshiba 351** ..... $999.00
**Electronic Arts** .. 30% off

**SERVICE AFTER THE SALE**
On-going service on a "first name" basis with the person you bought it from.

CIRCLE 270 ON READER SERVICE CARD

# Chicago Computer Connection INC

CIRCLE 270 ON READER SERVICE CARD

**The Right products, the Right prices, the Right services.** 5239 North Harlem Avenue, Chicago, Illinois 60656 (312) 774-0091

AMEX, Add 5%—MC/VISA, Add 3%—Shipping extra. IL residents add 8% sales tax. Personal checks, Add 3%. We Don't Hold Checks Because That Would Delay Delivery.

## CALL TOLL-FREE FOR OUR LOW, LOW PRICES! 1-(800) 422-2666

CCC-XT, CCC-AT, CCC-386, and CCC Portable XT are registered trademarks of Chicago Computer Connection Inc. IBM and COMPAQ are registered trademarks of their respective companies. All Orders PREPAID. Prices subject to change

# Arlington Computer Products gives you the best prices on IBM PCs...

## IBM XT

1 Drive, 640K, 20 MB Hard Disk

| Monochroma Monitor | Color Monitor |
|---|---|
| *$1575* | *$1775* |

***XT 286 (6 MHZ)***

1 Driva, 512K, 20 MB Hard Disk

| Monochrome Monitor | Color Monitor |
|---|---|
| *$2775* | *$2975* |

## IBM AT

1.2 Floppy, 512K, 20 MB Hard Disk

| Monochroma Monitor | Color Monitor |
|---|---|
| *$2795* | *$2995* |

***AT 339 (8 MHZ)***

1.2 Floppy, 512K, 30 MB Hard Disk
Enchanced Keyboard
***$4075***

## ...and COMPAQ too!

### COMPAQ PORTABLE

| | |
|---|---|
| 2 Drives, 256K | *$1595* |
| 1 Drive, 256K, 20 MB | *$1950* |

### COMPAQ 286

| | |
|---|---|
| DESKTOP — 1 Drive, 640K, 30 MB, Monitor | *$3075* |
| PORTABLE — 1 Drive, 640K, 20 MB | *$3295* |

### COMPAQ DESK PRO

| | |
|---|---|
| 1 Drive, 640K, 20 MB, Green or Amber Monitor | *$1750* |

### COMPAQ 386

***BRAND NEW AND IN STOCK***
CALL

## DRIVES & TAPES

| | |
|---|---|
| 360K Floppy for AT | $115 |
| 360K Floppy for COMPAQ | $99 |
| 10 MB Backup for XT | $389 |
| 20 MB Backup for XT | $459 |
| 20 MB Backup for AT | $489 |
| Plus Hard Card | $659 |
| 60 MB Backup for AT | |
| Internal | $739 |
| External | $899 |

***SEAGATE***

| | |
|---|---|
| 20 MB Kit for XT (Model 225) | $349 |
| 30 MB Kit for XT (Model 238) | $409 |
| 30 MB for AT (Model 4038) | $549 |
| 40 MB for AT (Model 4051) w/software | $659 |
| 80 MB for AT | $969 |

## BOARDS

| | |
|---|---|
| Harculas Color Card | $145 |
| Harculas Graphics Plus | $189 |
| STB EGA Plus | $269 |
| Paradisa Autoswitch | $345 |
| Quad EGA | $309 |
| Quadram Prosync | $349 |
| NEC GB-1 | $389 |
| Vega Video 7 | $365 |
| Everex Edga | $219 |
| Evarax Magicard w/384K | $159 |
| AST 6 Pack Prem. w/512K | $339 |
| AST Advantaga | $339 |
| AST Rampage PC w/256K | $259 |
| AST Rampage AT w/512K | $409 |
| Orchid Tiny Turbo | $399 |
| Intel Abova Board PC | $269 |
| Intel Above Board PC P/S | $299 |
| Intal Above Board AT | $359 |
| Intal Abova Board AT P/S | $399 |
| Irma Board | $739 |
| AST 5251-11 | $559 |

## MODEMS

| | |
|---|---|
| Hayes 1200 | $359 |
| Hayas 1200B w/Software | $335 |
| Hayas 2400 | $559 |
| Hayas 2400B | $499 |
| Evarax 300/1200 w/Soft. | $119 |
| Everex 2400 | $249 |

## ★ ISSUE HIGHLIGHTS ★

| | | |
|---|---|---|
| ***AST 6 PACK PLUS 384K*** ***$189*** | ***HAYES 1200B W/SOFTWARE*** ***$335*** | ***EPSON FX286E PRINTER*** ***$489*** |
| ***AST RAMPAGE AT W/2MB*** ***$539*** | ***EVEREX 300/1200 MODEM W/SOFTWARE*** ***$119*** | ***EPSON LQ 1000 PRINTER*** ***$639*** |
| ***PARADISE AUTOSWITCH*** ***$345*** | ***NEC MULTISYNC MONITOR*** ***$559*** | ***SEAGATE 20MB HARD DISK KIT*** ***$349*** |

## SOFTWARE

| | | | |
|---|---|---|---|
| Lotus 123 | $319 | D Base III Plus | $399 |
| Symphony | $429 | R Basa Systam V | $389 |
| Word Perfect 4.2 | $205 | Volkswritar III | $145 |
| Wordstar 2000+ | $279 | Smartcom | $65 |
| Multimate Adv. | $285 | Crosstalk | $99 |
| Microsoft Word | $259 | Norton Utilities | $59 |
| Framework | $399 | Managing Your Money | $115 |

## CHIPS

| | |
|---|---|
| 64K Ram Chips | 9 FOR $11 |
| 256K Chips | Each $2.75 |
| 8087-3/8087-2 | $109/$149 |
| 80287/80287-8MHZ | $169/$269 |

## PRINTERS

***EPSON***

| | | | |
|---|---|---|---|
| LX 86 | $199 | LQ 1000 | $639 |
| FX 86E | $359 | LQ 2500 | $1019 |
| FX 286E | $489 | EX 800 | $445 |
| LQ 800 | $439 | EX 1000 | $559 |

***OKIDATA***

| | |
|---|---|
| 192 Plus | $349 |
| 193 Plus | $525 |
| 292 w/Modula | $549 |
| 293 w/Module | $659 |
| Pacamark | $1749 |

***TOSHIBA***

| | | | |
|---|---|---|---|
| 321 | $459 | 351 Mod. II | $959 |

***NEC***

| | | | |
|---|---|---|---|
| P6 | $439 | P5XL | $999 |
| 3550 | $769 | P7 | $639 |

***IBM***

| | |
|---|---|
| Proprinter | $399 |
| Proprinter XL | $549 |

***HEWLETT-PACKARD***

| | |
|---|---|
| Laserjet | $2295 |
| Laserjet Plus | $3050 |

***SILVER-REED***

| | |
|---|---|
| EXP800 | $669 |

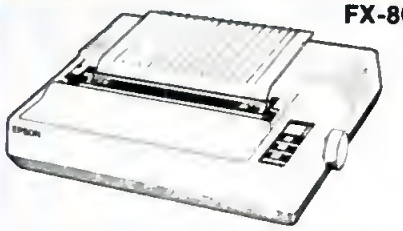
Arlington Computer Products, inc.
450 E. HIGGINS ROAD
ELK GROVE VILLAGE
IL 60007

FOR ORDERS & SYSTEMS QUOTES:
**800-548-5105**
FOR INFORMATION AND ILLINOIS CALL 312/228-6333
Prices and Availability Subject To Change Without Notice

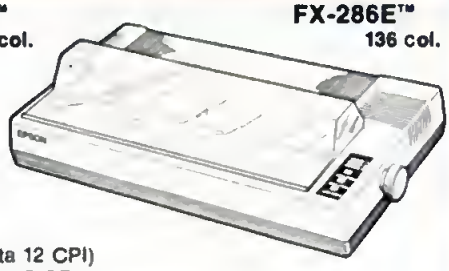
# America's choice and Arlington Computer Products choice is EPSON®

***It's not hard to understand why. Care in design, engineering and manufacturing have made Epson an industry leader and the industry standard. And to back their reputation, a one year warranty stands behind every Epson product.***

**FX-86E™** 80 col.

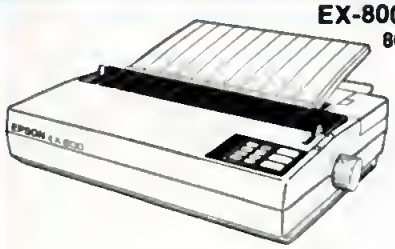


**FX-286E™** 136 col.

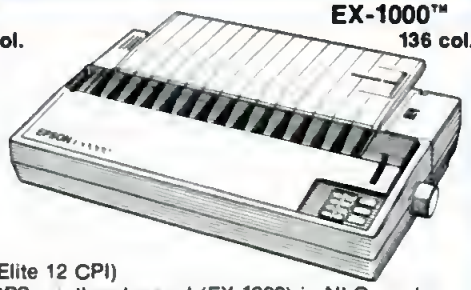


- 240 CPS printhead speed in draft mode (Elita 12 CPI)
- 48 CPS Printheed speed in NLQ Moda (Elita 12 CPI)
- Single stroke selection of NLQ/Draft modas; normal/condansed print modes
- Bidirectionel NLQ printing
- Autometic sheet load function
- Built in tractor
- 8K buffer stores up to four pagas of date
- 2 NLQ font styles
- IBM proprinter emuletion

**EX-800™** 80 col.



**EX-1000™** 136 col.

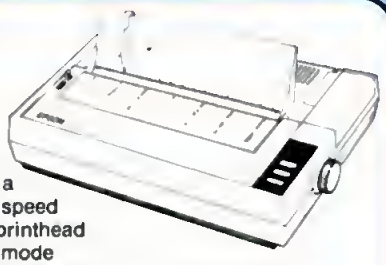


- 300 CPS printhaad speed in dreft mode (Elite 12 CPI)
- 54 CPS printhead speed (EX-800) or 60 CPS printhaad speed (EX-1000) in NLQ mode
- Push button front control panel for 8 diffarent typestyles
- Automatic sheet load
- 8K intarnal buffer stores up to 4 pages of deta
- Bidirectionai printing
- Built in tractor feed
- Color Qption Kit adds color to text end graphics

EPSON 1

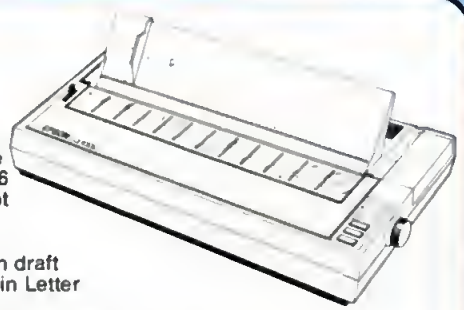
**Number one. And built like it.**

**LQ-800™**



- New smeller wire diameter 24 pin printhead produces elegant output
- Prints bidirectionally at a fest 180 CPS printhead speed in draft mode; 60 CPS printhead speed in Letter Quelity mode
- Easy front panel fingertip selection of dreft or Letter Quelity print modes
- Optional Identity Module and font modulas plug in for software compatability and a custom printed look
- Built-in sarial and parallel intarfaces for mexımum hardward capebility
- Standerd 7K buffer allows you to use your computar whila printing

**LQ-1000™**



- Speed and Letter Quality output are yours with this 136 column, 24 pin dot matrix printer
- Prints 180 CPS printhead speed in draft mode; or 60 CPS in Letter Quality mode
- Front panel fingertip selection of Lattar Quality or draft mode
- Identity Modules let you choose between Extended Epson, IBM 5152 Grephics or Diablo 630 codes
- Standard 7K buffer allows you to use your computer while printing continuas


Arlington Computer Products, inc.
450 E. HIGGINS ROAD
ELK GROVE VILLAGE, IL 60007

Call: 800-548-5105
In Illinois 1-312-228-6333

Best Prices
Best Service

**HARDWARE**

PANASONIC, TOSHIBA, AST, ATARI, COMPATIBLE COMPUTERS..... CALL

**MODEMS, BOARDS, DRIVES**

| | | | |
|---|---|---|---|
| Lotus Signal | 429 | Captain 384K | 159 |
| Evercom 1200 | 105 | Advantage Premium | 439 |
| Evercom 2400 | 229 | SixPakPlus 384K | 209 |
| Hayes Modems | CALL | SixPak Premium | 299 |
| Practical Modem 1200 | 135 | Intel Above Board PC | 225 |
| US Robotics 2400 | 189 | Above Board AT | 355 |
| Genoa Spectrum Plus | 249 | Tollfree J-Ram 3 | 189 |
| Hercules Graphics + | 179 | Mach 10 w/Mouse | 369 |
| EGA Wonder | 269 | Seagate 20M9 Kit | 369 |
| Everex EGA Enhancer | 205 | Seagate 30MB Kit | 399 |
| NEC GB-1 | 399 | Seagate ST4038 | 569 |
| Tecmar EGA Master | 275 | Filecard 20MB | 569 |
| Video 7 Vega Deluxe | 359 | Hardcard 20MB | 665 |
| 384K RAM Card | 85 | Drivecard 30M9 | 649 |

**OTHER HARDWARE**

| | | | |
|---|---|---|---|
| EPSON-All Models | BEST | Sweet P600 | 749 |
| LX/FX/EX/LQ | PRICES | Roland DXY 880 Plotter | 899 |
| Citizen Premiere 35 | 469 | Houston Inst Plotters | CALL |
| Tribute 224 | 659 | Amdek 410G | 159 |
| Overture 110 | 769 | Amdek 1280 w/card | 749 |
| Okidata Laserline 6 | CALL | NEC 1401 Multi-Sync | 569 |
| Panasonic 1091i | 279 | Quimax DM14 | 139 |
| Panasonic 1092i | 359 | Sony KV1311 RGB/TV | CALL |
| Panasonic P3131 | 269 | Sony 1302 Multi-Scan | CALL |
| Summasketch 1201 | 379 | Samsung TTL | 85 |
| Tiger Tablet II | 619 | Taxan 760 | 569 |

**SOFTWARE**

**SPREADSHEETS**

| | |
|---|---|
| Framework II | CALL |
| Lotus/Symphony | CALL |
| HAL | 107 |
| Open Access II | 305 |
| Ability | 61 |
| Mosaic Twin | 55 |
| PFS: Pro Plan | 139 |
| Silk | 83 |

**DATABASE**

| | |
|---|---|
| dBase III Plus | CALL |
| Genifer | 215 |
| Javelin | 135 |
| Rapid File | 255 |
| Paradox | 419 |
| R Base System V | 359 |
| Reflex | 83 |
| Revelation | 519 |
| PFS: Pro File | 139 |
| Q & A | 219 |

**GRAPHICS**

| | |
|---|---|
| Click Art Pers. Publisher | 79 |
| Harvard Pro Publisher | 399 |
| Page Perfect | 395 |
| Ventura | 599 |
| First Impression | 389 |
| EGA Paint | 47 |
| Fontasy | 43 |
| Freelance Plus | 339 |
| Harvard Pres. Graphics | 229 |
| Generic Cad | 69 |
| ProDesign II | 169 |
| Show Partner | 48 |
| Dr. Halo II w/Mouse | 105 |

**ACCOUNTING**

| | |
|---|---|
| Acct. Partner Plus | 399 |
| BPI Gen. Acct. | 159 |
| Complete Bus. Actng. | 159 |
| DAC EZ Accounting | 44 |
| Open Systems V3/Mod. | 449 |
| Real World | CALL |

**WORD PROCESSING**

| | |
|---|---|
| Manuscript | 349 |
| Microsoft Word 3 | 269 |
| Multimate Advantage | 269 |
| Word Perfect | 209 |
| PFS: First Choice | 102 |
| PFS: Pro Write | 115 |
| Wordstar Pro | 249 |

**UTILITIES**

| | |
|---|---|
| Microsoft C | 269 |
| Quick Basic | 60 |
| Turbo Pascal | 59 |
| Turbo C | 59 |
| Eureka: The Solver | 59 |
| Desqview | 59 |
| Windows | 59 |
| DS Backup + | 42 |
| Carbon Copy | 117 |
| Mace Utilities | 59 |
| Metro | 63 |
| Norton Utilities | 55 |
| Pop-Up Deskset | 43 |
| Disk Optimizer | 32 |
| Xtree | 31 |
| Statgraphics | 449 |
| Total Project Manager II | 309 |
| What's Best | CALL |

**800-662-2686** orders only

for Ca. Orders, Tech Support **415-668-9350**

**Call or Write for Free Catalog**

PAYMENT: No Fee For Visa, MasterCard, Cashier's Checks, Personal Checks with 2 week hold, Qualified P.O.'s. CA orders add sales tax.

SHIPPING: UPS ground-2% of order, $5 min. UPS Blue-3% of order, $7 min. Printers, Monitors, Computers — Call for charges.

All Products New with full warranties.

Price & availability subject to change without notice.

THE BAY Express COMPANY

584 CASTRO ST., SUITE 487 SAN FRANCISCO, CA 94114

a division of MCSS, Inc. Computer & Software specialists since 1981



# If You're Buying Hardware...

We realize that many of you prefer to buy from direct marketers because it's faster, more convenient and more economical. So PC Magazine's Direct Marketing Connection is for buyers like you.

In this special section, you can quickly find the products and services you're looking for at a competitive price. In fact, 75% of PC Magazine subscribers plan to buy or authorize the purchase of *printers* in the next 12 months.* This is the first place you should look when you're making your purchasing decisions.

*1986 Plan To Buy Study

PC MAGAZINE THE BIG BOOK BY ANY MEASURE.

# For Buyers Only...

We realize that many of you prefer to buy from direct marketers because it's faster, more convenient and more economical. So PC Magazine's Direct Marketing Connection is for buyers like you.

This section will help you get the products you need. This is the first place you should look when you're making your purchasing decisions. And given the amount of buying you will be doing in the next 12 months*, (i.e., 65% of subscribers plan to buy monitors, 75% printers, 61% add-in boards and 61% mass storage products) this special section will help you quickly find the products and services you're looking for.

*1986 Plan To Buy Study

PC MAGAZINE THE BIG BOOK BY ANY MEASURE.

PC MAGAZINE

# Marketplace

## The PC Buyers Guide to Products and Services

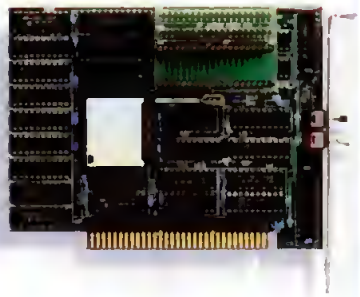
This is your showcase—your direct source of information on PC products and services. PC Magazine Marketplace gives you quick access to exactly what you're looking for, plus information regarding price, discounts, specifications and delivery. Use this guide to help you decide which products to buy.

# Slip this rocket in your socket and watch your productivity soar.

**Introducing the world's first half-size**

## 10 MHz

**accelerator card at a breakthrough price: $399.**



If you're pushing your IBM® PC,® XT,® 3270 PC,® Compaq® or other compatible to its outer limits, just drop in a *286 GTi* and blast off to new heights of productivity.

### Recalculate 360K spreadsheet in 9 seconds.

Lotus 123® Release 2.0

| | |
|---|---|
| Without 286 GTi | 1 min. 39 sec. |
| With 286 GTi | 24 sec. |
| 286 GTi with optional 8 MHz 80287 | 9 sec. |

### 100% software and hardware compatibility.

*286 GTi* can have your old computer outperform an AT.® At a fraction of the price. So protect your investment.

### No more cumbersome reset procedure.

*286 GTi* provides hardware reset switch.

To order, call **1•800•663•8550** U.S.

**Jadine Research Inc.**

1647 Willow Pass Road
Suite 334
Concord, CA 94520
(415) 955-2663

In Canada
305 – 1266 W 13th Ave.
Vancouver, B.C.
V6H 1N6
(604) 731-8338

*2 year warranty with unlimited free phone-in technical support.*

*30 day money-back guarantee. Dealers' enquiries welcome.*

**Jadine**

CIRCLE 499 ON READER SERVICE CARD

# TMC Electra-File DBMS System

**A computerized database management system specifically for Human Resource DataBase Management. Two versions are available, one for agency environment, one for departmental environment usage.**

## $399.95

**(Mention PC Magazine & receive 15% discount.)**

**Challenge Software is proud to announce the only totally UNCONDITIONAL FIVE YEAR guarantee (to registered owners) in the world!**

**For more information or purchase, contact your closest office.**
**In U.S.A.:**
**Post Office Box 6984,**
**Orlando, Fla. 32803**
**In Canada:**
**801 York Mills Road,**
**Don Mills, Ont. M3B 1X7**
**Ph: (416) 445-8900**

**See you at Booth #7 at UNIX '87 at the Toronto Hilton.**

CIRCLE 130 ON READER SERVICE CARD

# Saywhat?!™

# Now it's easy to design screens in any computer language.

**Saywhat?!™ is the newest tool for software designers and programmers. It's the fastest way to create stunningly beautiful screens for programs, prototyping, and slide shows. Saywhat?! is so intuitive to use that even people who have never created a screen before will feel right at home. Yet it has all the performance that veteran programmers want.**

## Speed!

Powerful commands mean *fast* screen design. Create screens quickly and visually in a "what you see is what you get" environment. Then, with one simple command in your program, your screens will all pop up like *magic*. Any program you write will run faster and look better with Saywhat?! screens.

## Features!

Everything you expect in a professional screen design tool is right at your fingertips, whether you use a color or monochrome system.

- Multi-style lines
- Color and monochrome drawing
- Walk-about mode
- Automatic box generation
- Block copy
- Rubber stamping
- Block paint
- Block move
- Block erase
- All color combinations
- 16 border colors (CGA)
- Text entry
- Blinking
- Extended character set
- Undo
- Print screen
- Direct access to DOS.

The endless possibilities make beautiful screen design easy and fun.

## Windows!

All your programs, even batch files, can have windows and instant help screens, up to three levels deep. Now you can give your programs that crisp "Sidekick™" feel.

## Languages!

Thanks to our new resident utility, instant screens are possible with any language running under PC/MS-DOS™. Like dBASE, Pascal, BASIC, C, Modula-2, FORTRAN, and COBOL. Saywhat?! is the perfect companion for the Clipper, WordTech, FoxBase, and QuickBASIC compilers. And screens can be modified without recompiling your code. Saywhat?! even writes clear, concise data entry code for dBASE, Turbo Pascal and BASIC. Slide shows and program prototypes can be arranged with as little as a simple batch file.

## Value!

Now comes the best part—a sensible, even incredible, price. $49.95. That includes a 68-page bound manual, a quick reference guide, sample screens, eleven utilities, and technical support. Not copy-protected. No licensing fees.

Just call the toll-free number to order Saywhat?! today.

When it comes to guaranteed, lightning-fast, first class screens, you're no longer on foreign ground.

Saywhat?!

**$49.95**

**(+ $5 shipping and handling)**

**800-HOT-WARE**
*(800-468-9273)*

*In California:*
*800-231-7849*

*In Canada:*
*800-663-9361*

*International:*
*415-571-5019*

*The Research Group*
*88 South Linden Ave.*
*South San Francisco*
*CA 94080*

*Saywhat?! runs on IBM PC/XT/AT™ and compatibles. Saywhat?™ is a trademark of The Research Group Sidekick and Turbo Pascal are trademarks of Borland International, Inc IBM PC/XT/AT and PC DOS are trademarks of International Business Machines, Inc MS DOS is a trademark of Microsoft Corp dBASE is a registered trademark of Ashton Tate, Inc*

© 1987 The Research Group

CIRCLE 107 ON READER SERVICE CARD

Only

ONE TOOL DOES IT ALL!

UNFRAGMENT $59.95

UNDELETE $99.95

CACHE $79.00

RECLAIM $49.95

UNFORMAT (Even when not installed)

You could pay $288.85 or ONLY $99.00

To Order Call 800-523-0258

Paul Mace SOFTWARE

123 N. First St., Ashland, OR 97520

Disk Optimizer, Norton Utilities, Lightning, and DS-Recover are trademarks of Soft Logic, Peter Norton Computing, PCSG, and Design Software.

CIRCLE 193 ON READER SERVICE CARD

9-TRACK TAPE
OCR SCANNING
WP CONVERSION

For thousands of customers world wide, we supplied the connection to get information into their PC.

Our **"SCANNING CONNECTION"** system can scan images for use with desktop publishing systems, convert images to text using our OCR software and send images to facsimile machines.

Our **"TAPE CONNECTION"** system can read and write 1/2" 9-Track 800/1600/6250 GCR magnetic tapes from large computer systems. Our **"DISKETTE CONNECTION"** system can read and write most 3½", 5¼", and 8" diskettes.

For more information please call us at 602-779-3341.

FLAGSTAFF ENGINEERING

1120 Kaibab
Flagstaff, AZ 86001

CIRCLE 180 ON READER SERVICE CARD

# If You're An Advertiser...

Here's where your ad belongs. This is exactly where serious PC buyers do their looking, comparing and buying. So you need to be here when they shop.

After all, PC Magazine delivers the largest audience of brand specifiers—the business people who are called upon to determine brands and models of PC products to be purchased by their companies.

You get a circulation of 375,000, the lowest cost per buyer in the industry, and 15% off the general advertising rate. Don't let a closing date slip past you. Be in the Big Book, it's where you belong.

PC MAGAZINE

THE BIG BOOK BY ANY MEASURE.

# NEVER FORGET ANOTHER COMMAND

**Never forget** another command with PC-DocuMate™ templates to remind you. **Save time** and **end frustration** because commands and formats are at your fingertips for **quick and easy reference.**

SMA's expertly designed, two-sided plastic templates are **easier to use** than booklets or reference cards. The data is complete, it's **properly organized** to help you, and it's available at a glance.

Over 500,000 PC-DocuMates are in use today–at home, and at work in America's major corporations–like IBM, AT&T, GM, Kodak, GE, Exxon, Xerox, Citibank, and hundreds more.

So order your PC-DocuMates today with confidence and join our **thousands of satisfied users**–who never forget a command.

**Attention Corporate Customers:** Call for quantity discounts or quotations on **custom** templates to meet your special needs.

**How To Order**

Select templates by program and keyboard style. Call for other software not listed here.

| PROGRAM | STYLE |
|---|---|
| DOS 2.0/2.1 | A C |
| DOS 3.0/3.1 | A B E |
| Lotus 1-2-3 | A B C D E |
| Multiplan 2.0 | A |
| dBASE III | A B C |
| dBASE III + | A B C D E |
| R:Base 5000 | A B |
| Symphony | A B E |
| DisplayWrite 3 | A B C D E |
| Lotus Manuscript | A B E |
| MicroSoft WORD | A B C D E |
| MultiMate | A B C D E |
| MultiMate Advantage | A B C D E |
| WordPerfect 4.1/4.2 New! | A B C D E |
| WrdStar 4.0 New! | A E |
| WordStar 2000 + | A B C |
| VolksWriter 3 | A |
| Do-it-yourself* | A B C D E |
| (Partial list, call for more) | |

*Comes with Free pen & eraser.

Keyboard styles available
A = IBM PC, PC XT, COMPAQ
B = IBM PC/AT
C = AT&T 6300
D = Key tronic 5151
E = IBM Enhanced New!

**NO-RISK, FULL 60-DAY GUARANTEE!** Use your template for a full 60 days. If you are not completely satisfied return it to us (undamaged) for a refund.

Dealer Inquiries Invited.

Systems Management Associates, Inc.
3325 Executive Drive, Dept. B-20
Raleigh, North Carolina 27609

NEW QUANTITY DISCOUNT PRICES!
3-9 templates–$15.25 each • 10-24 templates–$14.40 each
25+ templates–Please call

only **$16.95** each

B-20

Ask your Computer Dealer or to order by credit card call toll-free
**1-800-762-7874**
(In North Carolina call 919-878-3600)
or fill out the coupon:

Please send me _____ PC-DocuMate templates at _____ each . . . . . _____
(indicate template models on keyboard style chart)
Shipping and handling add . . . . . $2.00
Foreign orders, except Canada add $20.00 . . . _____
Canada and Puerto Rico add $4.50 . . . . . _____
North Carolina residents add 5% sales tax . . . . _____
TOTAL AMOUNT . . . . . _____

Method of Payment:
☐ Check/Money Order Enclosed ☐ MasterCard ☐ Visa ☐ American Express ☐ Choice

Card No. _____ Exp. Date _____
Signature _____
Name _____
Address _____
City _____ State _____ Zip _____
Daytime Phone ( ) _____
U.S. funds only. No CODs. Be sure to indicate keyboard style on listing and include with order.

CIRCLE 158 ON READER SERVICE CARD

---

Tandy® 1000 SX Computer

NEW! TANDY 20 Meg Hard Drive on A Card. List $799.00 Our Price $599.00

Tandy® 3000 HD Computer

# SAVE 20-40%

OFF LIST ON ALL TANDY AND RS EQUIPMENT

- **Save On All TANDY, Epson, Okidata Printers!**
- **Save On STB, Zucker, And Other Non-TANDY Boards And Software!**
- **Save On All Radio Shack Products!**

CALL FOR LATEST PRICES!

*You will be pleased with our courteous, efficient service... and with the knowledge that we WILL NOT be undersold.*

CALL TOLL FREE FOR ORDERS:
**1-800-44SHAAK**

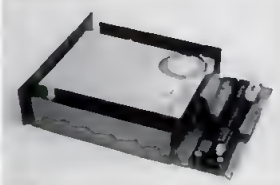
FOR COLORADO RESIDENTS AND INFORMATION CALL 303-249-9125

GREAT WESTERN ELECTRONICS
228 MAIN, MONTROSE, COLO. 81401
HOURS 9-5 MST, MON-FRI

CIRCLE 255 ON READER SERVICE CARD

---

# J&M HAS THE ULTIMATE IN 3.5" DRIVES



**J&M'S BRAND NEW 3.5" DRIVES** allow you to bring your system up to "state of the art" enhancement. You can exchange data with IBM* PC convertibles and other newer systems. You can backup hard disk data using half as many diskettes as you would need with the MS-DOS** BACKUP utility.

**J&M'S 3.5" DRIVES UTILIZE MACH 3.5,** the newly designed device driver software and formatter. **MACH 3.5** allows faster performances in read/write access and format capabilities and **RUNS ON ANY DOS 2.0** or later.

Also included with J&M's 3.5" drives is a copy of **ARC,***** the acclaimed file compression and backup utility.

**3.5" INTERNAL DRIVE W/MACH 3.5** **$199.00**
**3.5" EXTERNAL DRIVE W/CASE, PS, CABLE AND MACH 3.5** **$250.00**

**MACH 3.5** device driver software and formatter may also be purchased separately for use with any 3.5" drive. Only $29.95!

We accept Visa, Mastercard and prepayment. Or we can ship COD for certified check. Shipping is extra.

*IBM is a registered trademark of International Business Machines
**MS-DOS is a registered trademark of Microsoft Corporation.
***ARC is a trademark of System Enhancement Associates. ARC is distributed under the "Freeware" concept. If you desire to use it the authors would appreciate a contribution.

**J & M SYSTEMS, LTD.**
**15100-A Central S.E.**
**Albuquerque, NM 87123**
**505/292-4182**

CIRCLE 491 ON READER SERVICE CARD

# Professional Programming Tools

*For Programmers Compiling in*

**BASIC • C • COBOL • FORTRAN • PASCAL • dBASE**

GLENCO ENGINEERING is committed to providing professional programming tools. These sub-routines are completely debugged, and fully documented. Hand crafted in ASM, you are assured minimum size and maximum speed. You will literally save hundreds of man-hours in design, program and debug time. All are CALLABLE routines in .OBJ or .COM format. Please specify language and computer. NO ROYALTIES.

**WINDOWS.LIB*** — Pop-up windows, vertical menus, help screens. Set all borders, colors, size, position. Window editor included. Over 25 commands. $99

**WINDOWS with DATA ENTRY*** — Option for above. Adds 30 more menu and keyboard enhancement commands. Menus return integer and text allowing context sensitive help. $99

**BIOS.LIB*** — Several low level ROM BIOS routines. Categories: KEYBOARD, PRINTER, COMMUNICATIONS, VIDEO and MISC. $99

**DOS Functions*** — Alter DOS internal switches from inside your program. Read or set DTA, Interrupt Addrs., PSP, Verify, MEM, default drive, I/O and more. $99

**FILES LIB*** — Allows virtually any DOS file operation from inside your program. Read or set a files' Attribute, Mode, Data, Time. Check Write protect tab, free space, dir. $99

**NETWORK TOOLS** — Over 80 subroutines to interface to NETBIOS. Transaction process, multitasking, communications, and more. Works with any system supporting NETBIOS, or eqvt. $299

*Buy 4 get 5 Multiple purcheses discount and site licensing.

Call or Write
GLENCO ENGINEERING INC.
SERVING THE SOFTWARE INDUSTRY

## NO ROYALTIES

- IBM™
- Summit Software™
- MicroSoft™
- Lattice™
- Computer Innovations™
- Ryan McFarland™
- Realia™
- Nantucket™
- and More

3920 Ridge, Arlington Hts., IL 60004 (312) 392-2492 Telex 493-7109

CIRCLE 132 ON READER SERVICE CARD

# Still Searching?

We offer an integrated family of software products that allow you to search the Bible as never before.

With "THE WORD Processor" software (which includes the complete text of the KJV or NIV Bible) you can create indexes on key words, phrases, even concepts, as well as search, display or print, for just $199.95. Greek and Hebrew Transliterator products which include Strong's Concordance are also available. Or choose from a host of other exciting Biblical software products available in varying price ranges.

So if you're still searching, give us a call. We're anxious to show you how your PC can help you access your Bible as never before.

Include $3.00 for postage and handling. For Apple, IBM PC, Commodore 64, TRS80, MacIntosh, CPM 2.2, MS-DOS

BIBLE RESEARCH SYSTEMS
2013 Wells Branch Parkway, Suite 304
Austin, Texas 78728 (512) 251-7541

CIRCLE 341 ON READER SERVICE CARD

# Not Sure About A Product Or Service You've Seen Here?

Then why not fill out the reader service card right now, send it to us, and you'll receive more information directly from the vendor or manufacturer.

PC MAGAZINE
THE BIG BOOK BY ANY MEASURE.

LEARN ALDUS *PageMaker*. OR XEROX. VENTURA PUBLISHER ON THE IBM PC QUICKLY & EASILY WITH VIDEOTAPE TUTORING...

Ninety Minutes* of Easy Instruction Cross-Indexed to an Easy-to-Follow Workbook and Disk with Many Useful Examples

$99.95 *per program

MC VISA

COMPUTUTOR™

VIDEOTAPE TUTORING

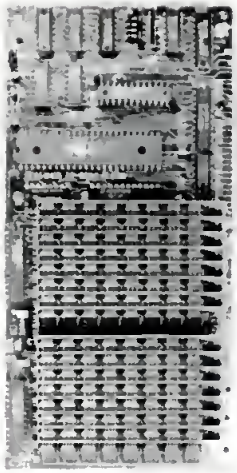
Customer Orders
818-709-6816

Information Dealer Inquiries
808-254-6419

P.O. Box 2183, Chatsworth, CA 91311

CIRCLE 224 ON READER SERVICE CARD

FOUR MEGABYTES LESS THAN ONE KILOBUCK!



The PC Tech Four Megger is long on a lot of things, like memory, reliability and performance. It's short on cost, power and length. The Four Megger comes complete with software for the Lotus, Intel, Microsoft Expanded Memory Specification as well as a fast memory disk program and an extensive diagnostic program. The Four Megger works in the IBM PC/XT/AT and compatibles at 4.77 or 8 MHz. All this for $850.

*Another smart idea from PC Tech.*

Now Available: The 16 Megger. Expanded memory for AT and XT, as well as extended memory for the AT. Call!

PC Tech

904 N. 6th St.
Lake City, MN 55041
(612) 345-4555

*Designers of the X16 and Other Fine Computer Products*

CIRCLE 385 ON READER SERVICE CARD

Here's What You've Been Waiting For...

A recent survey* showed that 70% of PC Magazine subscribers bought PC products and services by mail and telephone during the past year. So this special section is for those of you who choose to buy through this direct channel.

Just turn to our Direct Marketing Connection when you're doing your buying. Because it's easier than ever for you to compare prices, delivery terms, or service.

*Starch Study, July 1986

PC MAGAZINE THE BIG BOOK BY ANY MEASURE.

FREE SUBSCRIPTION!

Get a full year of R+R Direct Catalogs!

- Computer Supplies and Accessories
- Latest Software
- Office Supplies
- Plus Special Sales and New Products

YES! Put my name on your mailing list today.

Mail to: R+R Direct, P.O. Box 1702, Dayton, Ohio 45401. Or call 1-800-654-PLUS. In Ohio, 1-800-545-PLUS.

Name Title

Company

Address

City/State/Zip

Telephone ( )

17YBADV5

CIRCLE 249 ON READER SERVICE CARD

PC MAGAZINE

# MARKETPLACE

CLASSIFIED PRODUCT INDEX

## HARDWARE 431-436


ADD-ON-BOARDS ..... 431
CABLES .....
COMMUNICATIONS ... 431
COMPUTER SYSTEMS ..... 432
DISK DRIVES ..... 432, 433
DISKETTES ..... 433
EXPANSION UNITS ..... 433, 434
MONITORS .....
NETWORKING ..... 434
PERIPHERALS .... 434, 436
PLOTTERS ..... 435
POWER PROTECTION .....
POWER SUPPLIES ..... 435
PRINTERS ..... 435
SECURITY .....
SPEED DEVICES .. 435, 436


## SOFTWARE 436-450


ACCOUNTING .... 436, 437
ARTIFICIAL INTELLIGENCE .....
BACKUP SYSTEMS .....
BUSINESS ..... 437, 438
BUSINESS PROJECT MANAGEMENT .....
BUSINESS TIME MANAGEMENT ..... 438
COMMUNICATIONS ... 438
CONSTRUCTION ..... 438
DATA BASE ..... 439
DATA ENTRY ..... 439
DATA MANAGEMENT ....
DESKTOP PUBLISHING ..... 439
DEVELOPMENT TOOLS ..... 439, 440
EDUCATION ..... 440
ENGINEERING .... 440, 441
ENTERTAINMENT/ GAMES ..... 441
FINANCIAL ..... 441, 442
GENERAL ..... 442
GRAPHICS ..... 442, 443
HEALTH .....
INVENTORY ..... 443
LANGUAGES .....
LEGAL ..... 443
MAILING PROGRAMS ..... 443
MANUFACTURING .... 444


## SOFTWARE *continued*


MEDICAL ..... 444
MULTI-USER SYSTEMS .....
MUSIC ..... 444
ONE-OF-A-KIND ..... 444
OPERATION SYSTEMS ....
PREVENTATIVE MAINTENANCE ..... 444
PUBLIC DOMAIN ..... 445
REAL ESTATE ..... 445
RELIGION ..... 445
SALES MARKETING ... 445
SCIENTIFIC ..... 445
SECURITY ..... 446
SERVICES .....
SHAREWARE ..... 446
STATISTICS ..... 446, 447
TAXES ..... 447
TERMINAL EMULATION ..... 447
UTILITIES .... 447, 448, 449
WORD PROCESSING ..... 449, 450


## MISCELLANEOUS 450-453


ACCESSORIES ..... 450
BAR CODING ..... 450, 451
BUSINESS OPPORTUNITIES ..... 451
CATALOGUES ..... 451
COMPUTER INSURANCE ..... 451
COMPUTER LEASING .....
COMPUTER SERVICES . 451
COMPUTER TRAINING ....
CONSULTANTS .....
CONVERSION SERVICE ...
DATA CONVERSION 451, 452
DIGITIZERS ..... 452
DISK CONVERSION .... 452
DISKETTE COPY SERVICE ..... 452
EMPLOYMENT OPPORTUNITIES .....
FURNITURE .....
MAILING LISTS ..... 453
PUBLICATIONS .....
SUPPLIES ..... 453
USED EQUIPMENT .....


**Advertising Rates and Information: PC Magazine Classified Marketplace**

*PC Magazine Classified Marketplace* is a special economical section for product and service listings.
Listings are grouped by category and sold by column inches. Second color option available.
Standard Directory Listings are also available for a minimum of 4 issues at $305 per issue ($1220 total).
For additional information call 212-503-5115.


**PC Magazine Classified Advertising Staff**
**One Park Avenue, New York, NY 10016**
**(212) 503-5115**

*Advertising Director*
Kathryn J. Cumberlander
*Sales Manager*
Daniel L. Rosensweig
*Sr. Advertising Coordinator*
Monica Dixon
*Advertising Coordinator*
Angela Kiffin
*Sales Assistant*
Linda Annis
*Production Manager*
Anne Brockinton
(212) 503-5441
*Production Coordinator*
Wendy Long
(212) 503-4765


**Account Managers**

**Territory #1—Glenda Campbell (212) 503-5118**
CT, SC, VA, NC, NY, GA, PA, VT, MA, NH, WV, NM

**Territory #2—Paul Klein (212) 503-5156**
LA, MO, OK, HI, AR, KY, NB, WI, MS, IL, AL, MI, ME, IA, MN, TX
ALL OVERSEAS

**Territory #3—Dennis Leavey (212) 503-5176**
CO, MT, UT, CA, OR, ID, TN, (CA ZIPS 94000 & UP)

**Territory #4—Elliot Bryan (212) 503-5175**
AZ, CA, NV, FL, AK, IN, WY, DH, (CA ZIPS 93999 & DOWN)

**Territory #5—Wendy Friedman (212) 503-5117**
NJ, DC, MD, KS, ND, WA, SD, ALL CANADA

## HARDWARE/ADD-ON BOARDS

### PC-SPRINT

*"PC-Sprint from Exec-PC may be the speed demon you've been looking for."*
— PC Magazine

- Run your PC, XT or clone at 7.38 mhz.
- 280% Speedup (Norton SI rating)
- Speeds up all software — you can see the difference
- External speed switch
- External reset button
- Change speed "on the fly"
- Compatible with 8087
- Works with all color or mono displays
- "Slotless" plug-in on most PCs
- Includes Selectable top speed, instructions, warranty, tool, remote mount switch, free BBS subscription

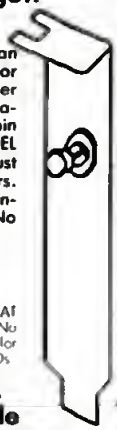
$89.95 V20 add $10. Call for information on other products

**Exec-PC, Inc.**
P.O. Box 11268 Shorewood, WI 53211
(414) 242-2173

CIRCLE 551 ON READER SERVICE CARD

---

**The RESET BUTTON that IBM forgot!**



At last a reset button for your IBM PC, XT or AT. You no longer have to turn your machine off and on again when CTRL-ALT-DEL doesn't work. A must for hard-disk users. Completely safe, installs in minutes. No soldering.

**$24.95**

Available for IBM PC, XT, AT and generic clones. No charge cards, add $2.00 for shipping, add $2.50 for CODs

**Irata - Reset.**
**2562 E. Glade**
**Mesa, Az. 85204**
**(602) 926-7969**

---

**Apparat, Inc.**

VOLUME BUYER PRICE LIST

LIFETIME WARRANTY
ON APPARAT MANUFACTUREO PC/XT/AT BOARDS · MIX OR MATCH TO ACHIEVE VOLUME DISCOUNT

| Part No | Description | QTY 10+ |
|---|---|---|
| 7600 | Clock/Calendar | $39.00 |
| 760216 | Eprom Programmer (24 or 28 Pin) | $77.00 ea |
| 7609 | 5 Function Combo II | $89.00 |
| 7624 | 64/384K Multifunction | $137.00 |
| 7630 | 64K/2M EMS RAM/Clock | $129.00 |
| 7670 | 256K/1.28M EMS RAM Multifunction | $179.00 |
| 7640 | 64/256K RAM | $53.00 |
| 7650 | 64/512K RAM | $77.00 |
| 7664 | 64/384K RAM/Clock | $89.00 |
| 7852 | 128K/3 MEG AT Combo | $179.00 |
| 7860 | 0 K Piggyback Card (1.5MB) For 7852 | $65.00 |
| 7870 | 128K/2MB AT RAM Only | $131.00 |
| 7950 | Short Slot Parallel/Serial | $59.00 |

C.O.D. CASH OR CASHIER'S CHECK
UNLESS PREVIOUSLY APPROVED
COMPANY CHECK
303-779-0819

ORDER LINE 800-525-7674

**APPARAT**
6801 S. DAYTON
ENGLEWOOD, CO 80112

CIRCLE 562 ON READER SERVICE CARD

---

**CHIPCLOK**

**10-year PC clock/ calendar in a chip!**

■ Automatic Date/Time with ten year battery backup ■ No slot needed ■ Easy plug in ■

**CHIPCLOK** w/software $79.00

**FAST 88**

**Makes your PC run like an AT!**

*PC Magazine* "Editor's Choice" (9/16/86)

■ No slot needed ■ Speed select & reset switch ■ 100% compatible with all software ■ Tech support ■

| | |
|---|---|
| ***FAST 88*** without CPU | $99.00 |
| ***FAST 88*** with 8088-2 | $105.00 |
| ***FAST 88*** with V20-8 | $119.00 |

30-day money-back guarantee

AMEX MC VISA COD

**To Order, Call or Write**
**1-800-722-2353 In USA**
**1-312-529-2552 In IL**

★ *Circle Reader Response for free PC Tip-of-the-Week* ★

**COMPUQUEST Engineering Inc.**
**801 Morse Avenue**
**Schaumburg, IL 60193**

CIRCLE 552 ON READER SERVICE CARD

---

**THE SHOWCASE FOR PRODUCTS AND SERVICES IN THE MS DOS MARKET . . .**

## COMMUNICATIONS

### BEST BARGAINS OF 1987!

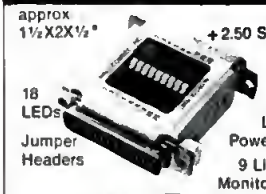
| Computers: | | Modems: | |
|---|---|---|---|
| AT&T— | | 1200B Internal w/Smartcom 11 | $313 |
| 6300 640K 1 Drive Mono | $1239 | 1200B External | $384 |
| 6300 640K 2 Drive Mono | $1419 | 2400B Internal w Smartcom 11 | $516 |
| 6300 640K 20 MB Mono | $1619 | Smartmodem 2400 External | $563 |
| **Panasonic—** | | **Ventel—** | |
| SR Partner 256K 2 Drives | $1195 | 1200 Halfcard w/Crosstalk | $259 |
| FX-600 2 DR Mono | $ 899 | PC 2400 Plus External | $389 |
| FX-600 2 DR Color | $1199 | Everex 300/1200 BAUD | $ 99 |
| | | DCA-IRMA | $729 |

**STARFLIGHT TELEMARKETING**
P.O. Box 685 Nitro, West Virginia 25143
1-800-423-7347
Call for additional info on other products
Dealer Inquiries Welcomed
MC/VISA Accepted

CIRCLE 561 ON READER SERVICE CARD

---

**thru BREAKOUT BOX $42.50**




**WireTap**
Hall-ComSec, Inc. (303) 223-8039
901 Sandy Cove Ft. Collins, CO 80525

CIRCLE 563 ON READER SERVICE CARD

---

MADE IN THE USA

**MODEM**

INTERNAL HALF CARD
HAYES COMPATIBLE

300-1200 Baud **$109.**

SOFTWARE INCLUDED

VISA-MC-AMEX

**800-854-0561 x 806**
In California Call

**800-432-7257 x 806**
INQUIRIES AND MAIL ORDERS
California Residents add 6% tax

**PHINE INC.**
2401 E. 17th St.,
Santa Ana, CA 92701

CIRCLE 557 ON READER SERVICE CARD

---

FAMOUS BRAND
**2400**
BAUD MODEMS

"Our Volume Buying means GIANT Cost Savings for you!!"

NOW ONLY $179

HAYES COMPATIBLE
U.S. MADE, 2YR MFG. WARRANTY
(300/1200 or 2400 bps)

WHILE SUPPLY LASTS
**805-656-3741**

CIRCLE 559 ON READER SERVICE CARD

---

**Hardware Computer Systems**

*continued on the following page*

CLASSIFIED

## COMPUTER SYSTEMS

**PC Import Center**
**FCC Approved; Phoenix BIOS**

XT Turbo Kit· $250 AT Turbo Kit $590
(Case, Power Supply, Motherboard, Keyboard)
XT Turbo Motherboard (4.77/8 Mhz) $110
AT Turbo Motherboard (6/8 Mhz) $385
XT 150W Power Supply $55
AT 200W Power Supply $80
XT Case $30 AT Case $70
MGP Card $60 CGA Card $52

Full Line of Add-On Cards
Complete Turnkey Systems Available

**Bestek Intl. Inc.**
4252 Blue Bonnet Drive
Stafford, TX 77477
(713) 240-0816
CIRCLE 585 ON READER SERVICE CARD

---

**Zenith data systems**

All Zenith Computers
640K, PP, SP, RGB,
DOS, Monochrome Mon.

PC-148 (4.77/8 Mhz)
2 fd $1248
20mb $1599
30mb $1899

PC-158 (4.77/8 Mhz)
2 fd $1678
20mb $1978
30mb $2078

PC-181 Laptop (New)
2 3½" fd $1629

(703) 440-9444

**WYSE**

WYSE PC-286 6/10 MHz,
1.2mb fd, 640K, Serial
parallel, DOS, clock
graphic card, WYSE 530
monitor, WYSE Kbd.

20mb $2399
40mb $2799

WYSE PC+ 4.77/8.54 MHz
2 Serial, 1 Parallel,
clock, DOS, 640K, Kbd,
mono/color graphics,
WYSE 530 monitor

2 360K $1458
1 360K + 20mb $1848

**SPERRY**

SPERRY IT 44mb, 640K,
1.2mb fd, 2 SP, 1 PP
clock, keyboard, DOS
free math co-proc

$2795

SPERRY MICRO IT 512K
1.2mb, 20mb, Par, Ser
clock, keyboard, DOS
graphics monitor

$2498

Prices and availability subject to change without notice.

TOTAL SOLUTIONS CONSULTANTS (The Mail Order Specialist)
9584 Old Keene Mill Road, Burke, Virginia 22015
CIRCLE 560 ON READER SERVICE CARD

**PRINTERS**

| | | |
|---|---|---|
| ALPS | 2000 | $718 |
| | 2100 | $1109 |
| NEC | P5 | $985 |
| | P6 | $459 |
| | P7 | $599 |
| OKIDATA | 192 | $329 |
| | 192+ | $375 |
| | 193+ | $529 |
| | 292 | $469 |
| | 293 | $603 |
| S/REED | 420 | $248 |
| | 600 | $564 |
| | 800 | $749 |
| TOSHIBA | 321 | $469 |
| | 341 | $642 |
| | 351 | $995 |

---

**TURBO 10MHz 1MB AT/XT**

OPEN 7 DAYS

ST $1,400 $1,950 w SEAGATE — 4038 30MB
@ 615 (720 x 350) AMBER MONITOR • INTEL 80286 6/10 MHz • ONE MB RAM ON BOARD • PHOENIX BIOS • HERCULES EMULATION GRAPHICS CARD /w PARALLEL PORT • ONE SERIAL PORT • OPERATES MS DOS, PC DOS, XENIX, UNIX, GW BASIC • 8 SLOTS • 1MB CONTROLLER 2FD/2HD • ENHANCED KEYBOARD • LEDS • 200 WATTS POWER • 1.2 MB TEAC FLOPPY • ON BOARD CLOCK CALENDAR • HARDWARE RESET • 80287 SOCKET • OPTIONAL EGA OR COLOR • OPTIONAL 0 WAIT STATE OR 12 MHz • FULLY SET UP/TESTED • MANUALS • ONE YEAR PARTS/LABOR

XT $700 $1100 w SEAGATE 20 MB & 5 FD
@ MES (720 x 350 AMBER MONITOR • INTEL 8088-2 OR NEC V 20 RUNNING 10MHz 330% FASTER THAN IBM PC • 640K ON BOARD • FULLY COMPATIBLE BIOS • HERCULES EMULATION GRAPHICS CARD /w PARALLEL PORT • OPERATES MS DOS, PC DOS, GW BASIC • 8 SLOTS • DUAL I/O CARD 2 FD CONTROLLER 2 SERIAL 2ND OPT'L PARALLEL, GAME, CLOCK/CALENDAR, BATTERY RAM, XSA, PSPOOL • AT KEYBOARD /w LEDS • 150 WTS • TWO 360K FUJITSU DRIVES • 8087 SOCKET • MANUALS • FULLY SET UP/TESTED • ONE YEAR PARTS/LABOR •

PORTABLE XT/AT SYSTEMS TOO!
PCPBS SYSTEMS, INC.
800-451-5278

135 W. 26TH STREET 8TH FLOOR
NEW YORK, NEW YORK 10001
(212) 627-4485

9832 E. FLOWER ST.
BELL FLOWER CA 90706
(213) 923-5852

---

**LOWEST PRICES**

**Turbo XT Basic System .. $399**

- 256K on Motherboard
- 360K Floppy Drive
- AT Style Keyboard
- 4.77/8 MHZ
- 150W Power Supply
- Floppy Drive Controller

**As Above with Mono Monitor and Card ..... $549**

**Turbo AT Basic System .. $995**

512K/200W PS/Keyboard/
6-10MHZ/1.2MB FD/HD&FD
Controller Clock/Calendar

**1200B Internal Modem .... $99**

**HUNTER Computer Center**

Open on weekends.
Call for other items.
• All Systems FCC Approved
2301 N. Collins, Suite 116,
Arlington, TX 76011

817-265-3772/214-692-5783
CIRCLE 568 ON READER SERVICE CARD

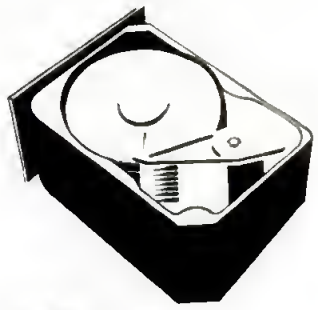
---

## DISK DRIVES

**8 INCH DISKETTE SYSTEM**
Read, write, and format diskettes from IBM mainframes, minicomputers, data entry equipment, etc. Complete easy to use software handles EBCDIC conversion. Can read and write CP/M 8-inch diskettes (many formats). You also can use 8-inch drives for PCDOS files, 1200 KB per diskette! $1095 complete.
MICROTECH EXPORTS
223 Forest Avenue
Palo Alto, CA 94301
415-324-9114

**Hardware Disk Drives**
*continued on the following page*

---



**120 MB $2,095**

**SpeedStor™ Subsystems for PC-ATs**

**160 MB $2,495**

VAR Pricing, Corporate Accounts Welcome

**Complete plug-and-play kits include:**
- Maxtor XT1140 or XT2190 — 28 MS average access time
- SpeedStor Partitioning Software — breaks 32MB DOS barrier
- Cables, rails, and easy to follow instructions
- One year warranty
- Immediate delivery

**We specialize in high capacity performance disk subsystems for DOS, XENIX, and Novell. We provide expert technical assistance for LAN file server and multi-user PC applications.**

STORAGE DIMENSIONS
*The Experts in High Capacity PC Storage*

408-395-2688
981 University Ave
Los Gatos, CA 95030

Storage Dimension's family of high performance products for PC storage.
- SpeedStor subsystems from 42MB to 640MB
- SpeedStor hard disk integration software
- SpeedStor 286 BIOS
- SpeedCache caching software

CIRCLE 556 ON READER SERVICE CARD

---

**PC Magazine Classified Marketplace**
**the ultimate target market!**

The brand specifiers who read PC Magazine don't have the time to shop around, their only concern is getting what they need as quickly as possible

**They'll DIRECT their attention to**
**PC Magazine Classified Marketplace**

For them PC Magazine Classified Marketplace's Direct Response/Display Ad format represents a fast, easy and cost effective method of product acquisition. They know it will have the products they need and the information they want regarding price, volume discounts, specifications and delivery.

If you think that your business can benefit from the 375,000 brand specifiers who read PC Magazine . . . YOU'RE RIGHT!

**So take DIRECT action and call (212) 503-5115**

## DISK DRIVES

**DISK UPGRADE BIOS FOR ATs**
OUB-14 overrides AT Drive Table to allow any compatible drive to be attached and fully used with standard AT controllers. Short card uses one half slot. Includes complete Set-Up routine and low-level format facility. Works UNIX, XENIX, PICK, other OS and networks. NOVELL is fully supported. $95 + $3 shpg. CA Tax.

GOLDEN BOW SYSTEMS
2870 Fifth Avenue Suite 201
San Diego, CA 92103
(619) 298-9349

## DISKETTES

**QUALITY DISKETTES**

5¼" DS-DD
100% Certified
Lifetime Warranty
U.S. Mfg., hub ring
**35¢**

Add 4¢ For Tyvec Sleeves, Labels & Tab
IBM AT 5¼" DS/HD **$1.29 ea.**

**Colored** 5¼" DSDD in 16 Diff't Colors **55¢**

Shipping $3 per 100 diskettes
Order by phone or send your check to

**AMERICAL GROUP**
**(818) 906-1132**
14200 Ventura Blvd. Ste. 201
Sherman Oaks, CA 91423

CIRCLE 598 ON READER SERVICE CARD

## EXPANSION UNITS

**DYNAMIC RAMS**

| | | |
|---|---|---|
| 1Mbit | 100ns | $22.00 |
| 41256 | 100ns | $ 3.60 |
| 41256 | 120ns | $ 2.50 |
| ✓41256 | 150ns | $ 2.20 |
| 51258 | 100ns | $ 6.90 |
| ✓4164 | 150ns | $ 1.00 |
| 4464 | 150ns | $ 3.25 |

☐ PROCESSORS
8087-2 8mHz $147.00
8087 5mHz $107.00
80287-6 6mHz $175.00
80287-8 8mHz $266.00
V-20 8mHz $ 12.75
V-30 8mHz $ 14.00

☐ STATIC RAMS
6264LP-15 150ns 1 2.95

☐ E. PROMS
27512 250ns $ 8.95
27C256 250ns $ 5.50
27256 250ns $ 4.75
27128 250ns $ 3.60
27C64 200ns $ 4.00
2764 250ns $ 3.25
2732A 250ns $ 4.25
8000's (Parts in stock)

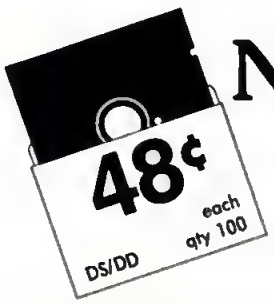
**I. C. EXPRESS**

ORDER TOLL FREE (Mon. – Fri. • 8-5)
**(800) 892-8889 • (800) 882-8181**
Outside California Inside California
CALL FOR CURRENT PRICES & VOLUME DISCOUNT • ALL MERCHANDISE IS 100% GUARANTEED
Prices Shown for Cash • MasterCard/VISA and 3% more • Prices are subject to change • Minimum order $10.00
California residents must add 6.5% sales tax • Shipping & handling: UPS Ground $5.00, UPS Air $7.00 (under 4 lb.)
15358 Valley Blvd. City of Industry, CA 91746 Phone: 818-369-2688

CIRCLE 573 ON READER SERVICE CARD

## DISKETTES

**SAVE TIME**
with
**FORMATTED DISKS**
*"Ready to use in your IBM PC or compatible."*




**Nashua**
48¢
**3M**
69¢

ALF formats brand-name factory certified disks, and double-checks them for defects. You save the time and hassle of formatting disks yourself, and pay no more than for ordinary blank disks!

CALL TODAY TOLL-FREE
**1-800-321-4668**
in Colorado, 303-234-0871

**ALF** 1315-F Nelson St. Denver, CO 80215

CIRCLE 600 ON READER SERVICE CARD

**THE SHOWCASE FOR PRODUCTS AND SERVICES IN THE MS DOS MARKET . . .**

**PC EXPANSIONS**

| | | | |
|---|---|---|---|
| AST SixpackPlus (384K) | $199 | HAYES Smartmodem 1200B | $339 |
| SixPakPremium (1M) | $299 | Smartmodem 1200 | $389 |
| Advantage (1.5M) | $499 | Maynard OnBoard 20 | $599 |
| Advantage (3M) | $879 | Sandstor Series | call |
| Rampage (2M) | $459 | MoynStream Tape from | $689 |
| RampageAT (2M) | $639 | WD File Card (20M) | $569 |
| INTEL Above PC/AT (2M) | call | Seagate 20M Hard Disk | $399 |
| Quadboard (384K) | $179 | Plus Development 20M HD Card | $699 |
| QuadportAT:139 | EGA+:$349 | Tandon TM102:109, Teac FD55BV: | $109 |
| HERCULES graphics board | $199 | Toshiba for AT:109 | 1.2M:$139 |
| Color Card | $159 | Set of 9 (64K):10 | (256k) $27 |
| | | 8087-3 | $119 |

**CALL**
**Monitors** . . . NEC, Amdek, Princeton GR
**Printers** . . . Citizen, Panasonic, Toshiba
**LaserPrinters** . . . Cannon, Qume, HP — All Popular **Software**

**VLM Computer Electronics**
10 Park Place • Morristown, NJ 07960 • (201) 267-3268
*Visa, MC, Check or COD*

CIRCLE 575 ON READER SERVICE CARD

**ICs PROMPT DELIVERY!!!**
SAME DAY SHIPPING (USUALLY)
QUANTITY ONE PRICES SHOWN for MAR. 16, 1987

DYNAMIC RAM

| | | | |
|---|---|---|---|
| 1Mbit | 1000Kx1 | 100 ns | $30.00 |
| 51258 | *256Kx1 | 100 ns | 6.95 |
| 4464 | 64Kx4 | 150 ns | 3.24 |
| 41256 | 256Kx1 | 100 ns | 3.25 |
| 41256 | 256Kx1 | 120 ns | 2.59 |
| 41256 | 256Kx1 | 150 ns | 2.39 |
| 4164 | 64Kx1 | 150 ns | 1.30 |

EPROM

| | | | |
|---|---|---|---|
| 27512 | 64Kx8 | 200 ns | @11.75 |
| 27C256 | 32Kx8 | 250 ns | 4.95 |
| 27256 | 32Kx8 | 250 ns | 4.75 |
| 27128 | 16Kx8 | 250 ns | 3.50 |
| 27C64 | 8Kx8 | 150 ns | 4.85 |
| 2764 | 8Kx8 | 250 ns | 3.25 |

STATIC RAM

| | | | |
|---|---|---|---|
| 43256L-12 | 32Kx8 | 120 ns | @13.95 |
| 6264LP-15 | 8Kx8 | 150 ns | 2.95 |

OPEN 8:30 DAYS 7 am–10 pm SHIP VIA FED EX ON SAT
SUNDAYS & HOLIDAYS SHIPMENT OR DELIVERY VIA U.S. EXPRESS MAIL
SAT DELIVERY INCLUDED ON FED-EX ORDERS RECEIVED BY
MasterCard VISA or UPS CASH COD
**Factory New, Prime Parts μPcon**
MICROPROCESSORS UNLIMITED, INC.
24 000 S. Peoria Ave. (918) 267-4961
BEGGS, OK 74421

CIRCLE 577 ON READER SERVICE CARD

**PC Magazine Classified Marketplace the ultimate target market!**

The brand specifiers who read PC Magaz ne don't have the time to shop around; their only concern is getting what they need as quickly as possible.

**They'll DIRECT their attention to PC Magazine Classified Marketplace**

For them PC Magazine Classified Market place's Direct Response/Display Ad format represents a fast, easy and cost effective method of product acquisition. They know it will have the products they need and the information they want regarding price, volume discounts, specifications and delivery.

If you think that your business can bene fit from the 375,000 brand specifiers who read PC Magazine . . . YOU'RE RIGHT!

**So take DIRECT action and call (212) 503-5115**

CLASSIFIED

## EXPANSION UNITS

### MEGAMEMORY AND DESKTOP PUBLISHING

**Lowest Prices in USA**

Fully Populated 2MB Boards

Made by Tall Tree Systems

HIGHEST QUALITY RAM CHIPS

| | |
|---|---|
| JRAM-2 | $319 |
| JRAM-3 LOTUS-INTEL | $369 |
| JRAM-AT | $389 |
| JRAM-AT 3 LOTUS-INTEL | $439 |
| JLaser-1 | $269 |

Super Combo Special
QMS KISS LASER Printer, 2MB JRAM-3, JLASER Module $2499

THE RAM EXPLOSION
5119A Leesburg Pike Suite 260
Falls Church VA 22041

(703) 569-4471

Dealer Inquiries Invited
VISA/MASTERCARD/AMEX

CIRCLE 553 ON READER SERVICE CARD

### THE BERNOULLI BOX®

IOMEGA®
BERNOULLI®

| | | |
|---|---|---|
| **A10H** | 10Mb single | $ 1 425 00 |
| **A20H** | 10 + 10 dual | 1 785 00 |
| **A120H** | 20Mb single | 1 625 00 |
| **A220H** | 20 + 20 dual | 2 295 00 |
| **A220H-W80** | Plus 80 | 4 750 00 |
| **PC2** | Adaptor + Software | 132 00 |
| **PC2B** | Bootable Adap softw | 187 00 |
| **A10** | 10Mb Cartridge | 59 00 |
| **A20** | 20Mb Cartridge | 78 00 |
| Cleaning Kit | | 79 00 |

MOUNTAIN 5¼

| | |
|---|---|
| 5¼ 20MB External | 1 590 00 |
| 5¼ 20MB Internal | 1 490 00 |
| 5¼ 20MB Cartridge | 102 00 |
| PC2 Adaptor | 203 00 |
| PC2B Bootable | 259 00 |

SELECTRONIX

19142 VAN NESS AV
TORRANCE CALIF 90501
213-320-8990 800-225-7010

CIRCLE 555 ON READER SERVICE CARD

## PERIPHERALS

**MotherBoard Clock $59**

SideClock does not use an expansion slot! The Innoventions' Clock Calendar, installs in seconds. Just open the computer cover and snap it into place. Never enter the time and date again. SideClock does it for you. Battery & Software included. 30 day $$ back gld. 2 year limited warranty $59. $3s/h. Site discounts.
Dealers welcome
ARISTO
16811 El Camino, #213-M
Houston TX 77058
713/480-6288, 800/3ARISTO

### 9 TRACK TAPE SUBSYSTEMS IBM FORMAT COMPATIBLE PC/XT/AT to MAINFRAME TAPE DATA EXCHANGE

- Read/Write data files to or from any computer on universally standard tape. Process anytime also
- Streaming and Start Stop Systems.
- For all PM compatibles
- 800 NRZI, 1600/3200 PE, 6250 GCR
- Fast reliable read-after-write hard disk backup
- Data Transfer Rate 1 to 4 MByte/Minute
- Record Translation EBCDIC-ASCII Conversion
- Total system all software & hardware supplied
- Best Installation and Software Support

9 Track Magnetic Tape System experience since 1971. We have supported hundreds of satisfied customer installations.

Call for complete information
Contech Computer Corporation
P.O. Box 160, Tarzana, CA 91356
(818) 343-6505

CONTECH

21800 Devonshire Avenue Suite 110
Chatsworth, CA 91311

CIRCLE 562 ON READER SERVICE CARD

### WE'LL BEAT ANY PRICE

PC/AT SYSTEM 1000

$1359

WITH MONITOR & VIDEO CARD
MONO $1359 / COLOR $1559

FREE! UL SURGE PROTECTOR WHEN YOU ORDER NOW

- 200W Power Supply/Case
- K-136 AT/XT Keyboard
- 1024K Memory On 80286 Mother Board
- 1.2M High Capacity Floppy Drive
- AT HCD/FDC Controller
- Mono or Color Graphic Adapter
- Assembled and Fully Tested

MAGITRONIC

MAGITRONIC TECHNOLOGY INC.
9-02 43 ROAD, LONG ISLAND CITY, NY 11101

EAST COAST ORDER
1-800-227-5454
INFO LINE 718-706-7670

WEST COAST SHIPPING IS NOW AVAILABLE

IBM® PC/XT are registered trademarks of IBM

All Orders are Shipped UPS COD Cash, Certified Check or Money Order

CIRCLE 567 ON READER SERVICE CARD

## NETWORKING

**VIDEO LAN™ "LINK SYSTEM"™**

For Composite, RGB or RS-232-C, color or mono comp /mon labs. Instructor has complete control of all trainee computer monitors. Instructor can 1) transmit image, 2) receive image, or 3) transmit any trainee image to any/all trainees. Software independent. Increases instructor efficiency & trainee comprehension.
APPLIED COMPUTER SYSTEMS, INC
3060 Johnstown-Utica Road
Johnstown, OH 43031
1-800-237-LINK

**TO PLACE YOUR AD IN PC Magazine Classified Marketplace Call (212) 503-5115**

**PC Magazine Classified Marketplace the ultimate target market!**

The brand specifiers who read PC Magazine don't have the time to shop around, their only concern is getting what they need as quickly as possible.

**They'll DIRECT their attention to PC Magazine Classified Marketplace**

For them PC Magazine Classified Marketplace's Direct Response Display Ad format represents a fast, easy and cost effective method of product acquisition. They know it will have the products they need and the information they want regarding price, volume discounts, specifications and delivery.

If you think that your business can benefit from the 375,000 brand specifiers who read PC Magazine ... YOU'RE RIGHT!

**So take DIRECT action and call (212) 503-5115**

**Hardware Peripherals**
*continued on the following page*

WE'LL DELIVER IT FAST!

PC/XT SYSTEM 800

$529

WITH MONITOR & VIDEO CARD
MONO $529 / COLOR $739

FREE! UL SURGE PROTECTOR WHEN YOU ORDER NOW

- Power Supply • Slide Off case
- 640K Expandable Mother Board
- 256K Installed
- K-136 AT/XT Keyboard
- 360K Drive • Floppy Control Card
- Mono or Color Graphic Adapter
- Assembled and Fully Tested

MAGITRONIC TECHNOLOGY INC.
9-02 43 RDAD, LDNG ISLAND CITY, NY 11101

EAST COAST ORDER
1-800-227-5454
INFO LINE: 718-706-7670

WEST COAST SHIPPING IS NOW AVAILABLE

IBM® PC/XT are registered trademarks of IBM
All Orders are Shipped UPS COD Cash, Certified Check or Money Order

CIRCLE 586 ON READER SERVICE CARD

## PLOTTERS

"D" SIZE PLOTTER

$1495.00 *

Model PC 34/36
Pen Plotter

ZERICON

CIRCLE 584 ON READER SERVICE CARD

## POWER SUPPLIES

SILENCER 150:
Quiet, Cool Power

Reviewed by PC Magazine 2-24-87, pg 48

- 155 watts
- 25% less heat
- 84% less noise

| | |
|---|---|
| Turbo-Cool PC/XT Cooling Fan | $69.95 |
| Turbo-Cool AT Cooling Fan | $79.95 |
| **Silencer 150 PC/XT Power Supply** | **$149** |
| Silencer 200 AT Power Supply | $179 |
| Turbo-Cool 150 PC XT Power Supply | $149 |
| Turbo-Cool 200 PC XT Power Supply | $199 |

*Quantity pricing avail Complete Tech Support*

PC COOLING SYSTEMS
31510 Mountain Way, Bonsall, CA 92003
(619) 723-9513 VISA/MC/COD/PO

CIRCLE 576 ON READER SERVICE CARD

NEW LOW PRICE
UL & FCC APPROVED

150W $39
200W $65

Qty. of 200 or more pcs.

IBM CLONE HARDWARE AVAILABLE
Manufacturer & Importer
HOT LINE: 818-333-0193
FAX 818-961-4337
A-TRONIC & Office Machines
15703 East Valley
City of Industry, CA 91744

CIRCLE 411 ON READER SERVICE CARD

## PRINTERS

An Uki for Your Oki!

Compatibility of IBM Plug-n-Play & versatility of Okidata Instruction Set at flick of switch. Easy to install. Complete — no other ROM needed. Utility software included. Specify printer model. Add $3 ship. NY res add sales tax. Oki 83, 92, 93 — $49.95. Oki 192, 193 — $79.95. Uki Switch Corp.

326 Linden Place
West Hempstead, NY 11552
212/685-8199

CIRCLE 587 ON READER SERVICE CARD

## PRINTERS

LASER PRINTER TONER CARTRIDGES

HP • APPLE • CANON • CORONA

* Volume Discounts * $79 * Dealer Inq Invited *

plus $2.50 shipping each prepaid

PORTATEK
12021 Wilshire Blvd.
Suite 44
West Los Angeles, CA 90025
(213) 827-7436

CIRCLE 592 ON READER SERVICE CARD

## SPEED DEVICES

XT286

MAKES YOUR PC/XT RUN FASTER THAN AN AT

$310.00

FEATURES

- HIGH PERFORMANCE/FULL COMPATIBILITY
- 80286 PROCESSOR/CLOCK SPEED/FULL 8 MHZ
- HARDWARE SWITCHABLE 8088 REMAINS IN SYSTEM FOR FULL COMPATIBILITY
- HARDWARE SWITCHABLE CACHE-DISABLE
- 80287 GOLD SOCKET AT 5/8 MHZ
- 8K HIGH SPEED CACHE MEMORY

Dealer Inquiry Invited
For Further Information

Call (617) 875-7912

BESTCOMP INTERNATIONAL CORP.
12 WILDWOOD TERRACE
FRAMINGHAM, MA 01701
TELEX 928116 ICHIBAN
FAX (617) 881 3903 3% MC/VISA

CIRCLE 570 ON READER SERVICE CARD

Hardware Speed Devices
*continued on the following page*

CLASSIFIED

## SPEED DEVICES

# IBM-AT SPEEDUP

## The High-Performance SpeedInjector™ from Ariel

As the industry's recognized leader in high-performance speedup products, Ariel has performed extensive research and developed unmatched experience in this field. Our products offer the complete solution.

- **XCELX 286/287 XPRESS™** A SpeedInjector for ALL IBM-ATs. Uses reliable frequency synthesis for full compatibility and high performance • 100% variable from 5-13 MHz CPU speed, while running • Made switch defaults to standard 6 MHz or fast mode • Hardware reset switch • Speedup the 80287 independently. Choose from: Standard ½ CPU speed, 8, 10, 12, 14, or 16 MHz actual co-processor speed • Rear mounted • One-year warranty ..... $ 99.95
- **XCELX 286/287 XPRESS + The Speed Utilities** The SpeedInjector with software that will display exact XCELX frequencies • speedup hard disk by 50% • speedup keyboard reaction time • correct floppy disk access ..... $139.95
- **FAST 80286-10** For CPU speeds of 10 + MHz ..... $299.95
- **FAST 80287** 8, 10, 12, 14, 16 MHz ..... Call
- **FAST RAM** 100 & 120 NS, 128K & 256K ..... Call
- **Mil-Spec Crystals** The famous Ariel Crystals. For early ROM ATs. Available 16-17-18-19-20-22-24 MHz ..... $ 19.95

increase overall speed up to 300%

Ariel

P.O. Box 866 – Flemington, NJ 08822

ORDER HOTLINE: 201-788-9002

CIRCLE 574 ON READER SERVICE CARD

## SPEED DEVICES

The **TurboMax** is an accelerator board which increases your Leading Edge, IBM PC/XT, and clones to 9.54MHz optimizing performance, while maintaining 100% capability with all hardware and software.

FEATURES: * No expansion slot required * Totally "transparent" to system and user - no DOS patches * Speeds up operation of the new high capacity memory boards and high resolution graphic boards * No modification to hardware or software

SPECIFICATIONS: * CPU 10MHz 8808 running at 9.54MHz in high speed mode, 4.77MHz in normal mode

**PERFORMANCE COMPARISON**

The table below compares the performance of the TurboMax with other products. The PC Magazine Laboratories Bench Mark Tests were selected because of their well-known accuracy. The numbers indicate speed relative to a "stock" IBM pc. For example, factor of 1.67 in a category means the system is running 1.67 times faster than a stock pc.

| | ***TurboMax | Surprise | fast 88 |
|---|---|---|---|
| Test #1: NOP executive spanning 128K | 1.67 | 1.31 | 1.43 |
| Test #2: "do nothing" 1 NOP loop | 1.80 | 1.59 | 1.53 |
| Test #3: Integer add from memory | 1.85 | 1.53 | 1.56 |
| Test #4: Integer multiply from memory | 3.13 | 2.80 | 2.64 |
| Test #5: Floating point without 8087 | 1.97 | 1.59 | 1.66 |
| Test #6: Floating point with 8087 | *1.95 | --- | **1.43 |
| OTHER COMPARISONS: | | | |
| Norton Utilties SYSINFO index | 3.2 | 2.8 | 2.6 |
| High speed copy and format? | yes | yes | no |
| Software speed switching? | yes | yes | no |

Notes: * requires optional 8087-1 10MHz math co-processor chip
** requires optional 8087-2 8MHz math co-processor chip
*** Formerly Supercharger

**ONLY $279.00 COMPLETE**
Visa, MC, COD, and Checks Accepted
Full 1 Yr. Warranty

**Order Desk: Tel. 1-800-443-2217**
**Service And Info. (412) 882-6700**
**30 Day Money Back Guarantee**

**K & L DISTRIBUTORS Inc.**
**3 Munsey Ave. • Pittsburgh, PA 15227**

Dealer Inquiries Welcomed

CIRCLE 580 ON READER SERVICE CARD

## SOFTWARE

## ACCOUNTING

### CPA Review Pass/Refund

You Pass or We Pay! Over 2,100 computer interactive multiple choice & essay/problems. Call for details on the progressive way to study. Also Diagnostics for CMA, CPA, CIA Exams. Personnel Evaluator. IBM PC, XT, AT, or compatibles. Individual, Office, College Packages Available. AM EXP, Master Card, Visa Accepted

MicroMash

MicroMash
14 Inverness Dr. East F-104
Englewood, Colorado 80112
(800) 241-9700, In CO (303) 799-0099

### dBASE ACCOUNTING TOOLS

*GENERAL LEDGER *ACCTS PAYABLE
*dINVOICER & A/R *SALES ANALYSIS
*SERVICE BILLING *ORDER ENTRY
*JOB COSTING *JOB ESTIMATING
*PURCH ORD/INVENTORY *PAYROLL
$99 ea + s&h w/dBASE 2, 3 or 3+ Source Code
dATAMAR SYSTEMS
6809-P Convoy Court
San Diego, CA 92111
(619) 278-8222
Visa-M/C-AMEX-Check-COD

### MAINSTREAM ACCOUNTING

The most innovative fully integrated accounting system in today's market. Information entered once will automatically pass to all necessary files, A/P, A/R and G/L. With the capacity to handle Job Cost, Payroll and Inventory. Mainstream Accounting, a better way for you and your business. Compat. with all MS/DOS operated machines. Intro. offer only $99
DESERT RESEARCH CORPORATION
9500 I Avenue, Suite 204
Hesperia, CA 92345
(619) 948-2293

### LOAN CALCULATION PLUS! $69

The #1 Loan Calculation & Print Software Pkg. Solves virtually every loan calc. Amorts, Irreg Amorts, Present/Future Value, Rule of 78th Payoff & Rebate Calcs, IRS Interest & more! Works on all MS/PC-DOS machines w/128k min. Join the thousands of users who find LOAN SHARK indispensable.
LOAN SHARK™ Easley Microsystems, Inc.
234 North O Street
San Bernardino, CA 92401
(714) 381-3379

### ACCOUNTING SOFTWARE

*POWERFUL *EASY-TO-USE
*FULLY INTEGRATED ACCOUNTING SOFTWARE, *GENERAL LEDGER *ACCOUNTS PAYABLE *ACCOUNTS RECEIVABLE *PAYROLL *INVENTORY CONTROL *CHECKBOOK MGT.
.....ALL FOR JUST $99 .....
CALL.
Dash/Accounting
Los Gatos, CA 95030
1-800-628-282B ext. 625
(INFO.) 408-356-3616

### NCS FUND ACCOUNTING

Powerful fund acct'g software for local govts, schools, and other non-profit entities. System is customized to user needs. Modules: GL, AP, AR, Encumbrance, Budgets, J-Entry, Chkwrt'g, User-Designable Reports. Integrates with NCS PAYROLL and UTILITY BILLING and operates on the IBM family of micros and compatibles.

NATIONAL COMPUTER SYSTEMS

NATIONAL COMPUTER SYSTEMS, INC.
PO Box 9365
Minneapolis, MN 55440
800-328-6172/612-830-7652

**Software Accounting**

*continued on the following page*

## ACCOUNTING

**fmi**
Representing The Leading Fund Accounting Systems
(208) 882-8175 or (209) 333-1575
P.O. Box 1048 • Lodi, California 95241 USA
**25% OFF PC-FUND**
PC-FUND © AFW Inc
CIRCLE 597 ON READER SERVICE CARD

**A Great Idea in Financial Shareware for Home and Business**
**MONEYCOUNTS®**
*But... it only costs $12!*

. . . And you get a CPA-designed, interactive money management/accounting system that can handle 999 different accounts and 24,000 transactions a year.

**MANAGE . . .** Cash, checking, savings, credit card accounts. Its Smart Account Reconciler will balance the toughest bank statement quickly.

**PREPARE & PRINT . . .** 4 different types of financial statements (incl. net worth), 3 different inquiry reports, general ledger and accountant's trial balance.

**PLUS . . .** Budgeting, financial data base, pop-up calculator, graphics, color, tutorial . . . and more.

**AND . . .** If you own a small business, MoneyCounts® will track both your business and personal finances and report separately on each.

Now shipping Version 3.9. There's no catch. This is a fully-functional system that compares with products selling for $99 or more.

Order today and own MoneyCounts® for only $12! Iowa residents add 4% sales tax, add $3 shipping and handling (outside North America add $10). VISA and MasterCard orders call:

**1-800-223-6925**
(in Iowa 319/373-0224)

Parsons Technology
Dept. M
6925 Surrey Drive NE
Cedar Rapids, Iowa 52402
CIRCLE 589 ON READER SERVICE CARD

### ACCOUNTING KIT $79.95

Peanuts & Caviar is a kit designed to introduce the principals of accounting and bookkeeping to non-accountants. It includes a resetable general ledger software package free. The kit consists of a 300 page book, worksheets, homework, homework analysis and GL software. The software generates detailed reports, trial balance, income statement and balance sheet. IBM or compatible. Used in curriculums by Platt College, Denver Public Schools, etc. $79.95.
Learn-Ed Software
8400 E. Iliff Suite 11
Denver, CO 80231
1-800-621-8385 ext 736

### MIP FUND ACCOUNTING

The MIP Fund Accounting System meets the financial and managerial reporting requirements of not-for-profit and governmental organizations. The System features multiple fund and fiscal years, user-defined reports and six levels of account coding. Modules offered: G/L, A/P, A/R, Payroll, Encumbrance, Expenditure Budget, Revenue Budget and Lotus/DBase Interface. MIP FAS is available for IBM XT and compatibles.
MICRO INFORMATION PRODUCTS
505 East Huntland Dr. Suite 340
Austin, Texas 78752
(512) 454-5004 1-800-MIP-FUND

### CPA's CLIENT WRITE-UP $250

Now a low cost, proven system featuring complete general ledger with flexible report formats, statement of change, job cost and optional Lotus/dBase interface. Aller-the-lacl payroll provides earnings records, state u/c, 941's, W-2's and 1099's. Runs on all IBM PC/XT/AT and compatibles with 256K. $250 complete-including printed manual. 14 day Free Trial.
HOWELL ASSOCIATES
4545 Bissonnet Suite 286
Bellaire, Texas 77401
713-661-6652

### PC-FUND

The leading fund accounting system for local govts and non-profit organizations. Modules include General Ledger, Accounts Payable, Encumbranca, Obligation Tracking, Accounts Receivable, Payroll, Budgeting, Fixed Assets and Donor Receipts. The system supports up to 99 funds, 9999 depts. PC-FUND runs on the IBM-PC and most MS-DOS and XENIX computers.
AMERICAN FUNDWARE, INC
PO. Box 773028
Steamboal Springs, CO 80477
800-551-4458 (303) 879-5770

THE SHOWCASE FOR PRODUCTS AND SERVICES IN THE MS DOS MARKET . . .

## BUSINESS

**BUSINESS OFFICE AUTOMATION!**
**WITH ASHTON-TATE PRODUCTS AND . . .**
SPECIALIZED ATTORNEY, OFFICE MANAGEMENT, REAL ESTATE, TIME & BILLING, ACCOUNTING, CUSTOM/GENERAL RETAIL OR WHOLESALE OFFICE PACKS, VARIOUS OFFICE PACKS PRICED FROM $995.00 TO $2875.00.
RESELLER DISCOUNTS BUSINESS PACK ™ 1 (800) 624-2232, EXTENSION 777
REGIONAL DEALSHIPS AVAILABLE 24 HOURS
CIRCLE 413 ON READER SERVICE CARD

**timeslips**
**POP-UP TIME & BILLING SOFTWARE**
**$99.95**
**"Jewel of a Billing Program"**
**—INFOWORLD, RATED 9.3, Nov. 3/86 Issue**
TIMESLIPS LETS YOU...
- Track time like a "stopwatch"
- Track time like a "stopwatch"
- Over 5,000 professional bill formats with aged receivables, flat fee and more
- Produce custom business and financial reports
- Export to spreadsheets and databases
- Track retainer/trust account

Call (800) 225-5669 to order.
For rush service/more information, call (617) 468-7358.
Add $7 s/h. Not copy protected. 30-day money back guarantee.
NORTH EDGE SOFTWARE CORP.
PO Box 286
Hamilton, MA 01936
CIRCLE 573 ON READER SERVICE CARD

### PC BUSINESS SOFTWARE

Payroll on Piece Rate,
Job Cost, Inventory,
Time & Material Billing,
Purchase Orders,
Accounting & more.
As Low As $175,
ABC is AFFORDABLE

Executive Data Systems
(800) 367-6081
(713) 437-8913

### **VEHICLE MAINTENANCE**

Maintain records on all types of equipment. Written in compiled language and very easy to use. Capture all related cost per item. Reports include: routine maint., scheduled maint., repair cost, vehicle cost analysis, fleet cost analysis, fuel class, fleet status reporting, license expiration and more!!
**OMNI DATA SYSTEMS**
1000 Executive Parkway, Suite #229
St. Louis, MO 63141
**(314) 576-5757**

### CHECK WRITING MANAGER

For Lotus 1-2-3. Easy to use program for managing any number of checking accounts. Prints checks, tracks expenses & income, handles deposits, bank charges, reconciles account. Reports include unsorted checks, checks sorted & totaled by category. $149.95 - FREE TRIAL - 30 DAY MONEY BACK.
RD SOFTWARE
18 Briarcliff Avenue
Poughkeepsie, NY 12603
914-462-1879

### PLANS 'n TOTALS™

The Journal of Corporate Computing said "for all aspects of business planning, budgeting, forecasting, operational, financial analysis, for up to 5 years. If your budget allows only 1 software purchase this year P&T should be it." The book of IBM software said "Ease of use 'A', value for money 'A', overall rating 'A'. Ag Computing said "Instant analysis without entering a single formula!" Much easier and more productive than spreadsheets. No formulas to enter! Over 100 built-in reports & statements. Only $99. Factory direct. Credit cards. 12 month money back guarantee.
Resource N Corporation
721 Lowell Street
Carlisle Ma. 01741
617-264-4450

### PC ORDER PAD

For Manufacturers, Wholesalers or Retailers. MAKE MORE MONEY by automating your order processing function. Handles Cash and Charge sales with an End-of-Day Cash and Sales Summary report. Produces a Customer Receipt/Picking slip. Keeps track of inventory. Can easily use BAR CODE or OCR input. Will Import/Export files in ASCII format. EASY & FAST with full on-line HELP screens. Runs on most MS DOS computers with 384K, hard disk, 80 col. printer. Cash drawer optional. Custom modifications & Support available. Dealers invited. Demo $15
COLUMBIA SOFTWARE, INC
10420 S.E. Hillcrest Drive
Portland, OR 97266
(503) 654-7722

CLASSIFIED

## BUSINESS

### LP88-LINEAR PROGRAMMING

A powerful menu-driven system for solving linear programs with up to 510 constraints and 2510 variables. Features include interactive and batch operation, spreadsheet-style input and editing, a storage system for problems and bases, sequential file input/output. Simplex algorithm restart, a complete report generator, sensitivity analysis. Requires 192K, $99 with 8087 support, user's guide, VISA/MC.
EASTERN SOFTWARE PRODUCTS, INC
POB 15328
Alexandria, VA 22309
(703) 549-5469

The long-awaited, complete business travel expense system is here! It's easy to use! An administrative person can maintain the data, or even the returning traveler can enter it

- Keeps detail travel information
- Prints expense statements
- Prints checks and registers
- Processes permanent & temporary advances

IBM PC/XT/AT & Compatibles
Intro Price $195.00 30 Day Money-Back Guarantee

TravelTrak
The Business Travel Expense System
P.O. Box 4261
Greenwich, CT 06830
203-531-0288
CIRCLE 397 ON READER SERVICE CARD

Save Legal Fees By Using LegalEase™

LegalEase™ is a simple, ready-to-use business and legal forms system for IBM® PC's with over 150 time-tested models for contracts, agreements, leases, notices and binding business forms. Edit with PC Write® WordStar® MultiMate™ or any other standard word processing software. LegalEase™ is menu driven and was written for non-lawyers by a respected Boston attorney, Richard H. Gens.

*NEW!* The Real Estate and Corporate Modules of LegalEase™. The Real Estate Module comes complete with a wide range of Real Estate forms. The Corporate Module contains all the basic legal forms for corporate meetings.

*Soon to Follow!* The High Tech Module of LegalEase™

LegalEase: $129.95 (add $7.50 p&h). Both the Real Estate Module and the Corporate Module, $99.95 ea. (add $7.50 p&h). Any combination of packages, take $10.00 off each package (add $10.00 p&h).

1-800-628-2828 Ext. 706

LegalEase

HDG Software, Inc.
54 Whitney Street, Sherborn, MA 01770
For faster service, call us at (617) 651-1881
CIRCLE 596 ON READER SERVICE CARD

### LEGAL HELP- ON A DISK!

MICROLAWYER™ FORMS are templates for most common legal forms. Includes complete detailed instructions. Three versions with over 40 forms each. Examples

- Business: consulting, leases, partnerships
- Corporate: articles, bylaws, meetings
- Personal: wills, loans, marital agreements

$49.95 ea., $89.95 for 2, $124.95 for all 3. $3.50 S&H. Specify computer, word processor.
Computer Systems Integration, Inc.
PO Box 28113 Sta #16, Dept P
Lakewood, CO 80228
(303) 986-3102

### MAX PROFITS WITH LINDO*

Join the thousands already using a LINDO optimizer on business planning problems. Quickly generate a Maximum Profit/Minimum Cost Plan with one of the following:

* LINDO—for Linear, General Integer and Quadratic Optimization
* GINO—for Nonlinear Optimization
* VINO—adds Optimization to Spreadsheets

LINDO Systems, Inc.
PO Box 148231, Dept. P
Chicago, IL
(312) 871-2524

## BUSINESS TIME MANAGEMENT

### TIMEZONE™

When phone work is long distance you need more than one clock on the wall. Timezone pops-up 24 world time meridians on your IBM compatible screen, with cities or labels. Hayes compatible keyboard dial, auto redial. COM 1&2. $14.95, Timezone2 16# directory $24.95, Timezone3 64# directory $34.95. Not copy protected, $3 S&H. Check, M.O.
Pacific Speech Systems
PO Box 31313
Seattle, WA 98103
206-526-1400 9-2 PST

### CALENDAR PLUS 2 (VERSION 3)

A time management system that displays activities in block calendar, prints calendar for selective range of activities, times, personnel or locations. Print calendar extracts in tabular lists, merges separately maintained calendars. Much more. PC-DOS/MS-DOS VERSION 128K, any printer $249.00
TIME PLANNERS INC
PO Box 400
Tyrone, Georgia 30290
404-487-9355

### PHONE AND TIME MANAGER

PRODEX Phone & Time Management System for ANYONE with a Phone & PC! Instantly locate names & phone numbers. Auto-dial. Record notes of conversations, log calls, create tickler files, maintain to-do lists, many more features. Essential for salespeople & professionals. Memory resident. $89.95 (VISA/MC)
Prodex Development Company
5818 East Greenlake Way North
Seattle, WA 98103
(206) 527-2898

## BUSINESS TIME MANAGEMENT

### TIME MANAGEMENT SYSTEM

"PrimeTime effectively weaves together a collection of tools into an extremely useful and powerful time management resource. PrimeTime works, and its worth every nickel." (InfoWorld 8/25/86) Runs on IBM or compatibles in resident or stand alone mode. 30 day money-back guarantee. Not copy protected. $99.95

Prime Time

WISEWARE, INC
3176 Pullman St. #106
Costa Mesa, CA 92626
(714) 556-6523 Ext. 102

### *** DATEBOOK $89.95 ***
### *APPOINTMENT SCHEDULER*

Ideal for Professionals! Features include help windows, multiple bookings, flexible time intervals. Searches for openings within specified days and time. Supports 20 different schedules. Prints daily appts. IBM/XT/AT compatible (w/hard disk) $89.95 - $4 s/h, Chk/Visa/MC, MO add tax
*** EXECUTIVE COMPUTER SYSTEMS ***
**** 1571 Fenpark Drive ****
***** Fenton, MO 63026 *****
****** (314) 343-5757 ******

## COMMUNICATIONS

Attention Bulletin Board Sysops!
*FoReM* is THE MOST POWERFUL BBS you can run on any personal computer!

If that's not reason enough to be running your BBS on FoReM ST/PC 1.10, here are 4 more reasons:

1) New Lower Price of **$59.95** + $4 s/h
2) **FREE** updates via our BBS (617-620-0903)
3) We implement over 90% of all suggested features
4) Features! Features! Features!
Online Graphics, 64 Sigs, 400 download categories
Numerous selectable options, US Robotics™ HST 9600 bps support
5 file transfer protocols including: Ymodem Batch and Kermit
The largest command set of ANY BBS, Online Help

To Order Call 617-626-1388
Visa/MC/COD Accepted
Commnet Systems
24 Randy Road, Framingham, MA 01701
CIRCLE 588 ON READER SERVICE CARD

## COMMUNICATIONS

### MULTI-USER BBS

(FOR IBM PC/AT)
TEAMate - a mainframe quality BBS. A mini Compuserve. Full screen cursor-controlled interface, topic outline structure, public and private topics, audit trails, xmodem, integrated mail, content retrieval and more. MS-DOS, XENIX and UNIX versions.
MMB Development Corporation
1021 No. Sepulveda Blvd., Suite K
Manhattan Beach, CA 90266
213-545-1455

## CONSTRUCTION

### CONSTRUCTION ACCOUNTING

The CMAS system is designed for contractors where tracking job costs is required. Modules include: Job Cost, PR, A/R, A/P, GL, PO's, Inventory, Service, Dispatch, and Estimating. CMAS software is fully integrated & ties into most spreadsheet & WP programs. Multi-Terminals available.
DATA-BASICS
11000 Cedar Road - Suite 110
Cleveland, Ohio 44106
(216) 721-3400

### CONSTRUCTION MANAGEMENT

Affordable, understandable software for builders. Job cost, billing time and materials or percent complete, payables, change order and retention tracking in one package. Prints checks, statements, bids, 30 + reports. Clear manual & help windows, backed by our professional phone support staff. $795
YAROI SYSTEMS, INC
3324 State Street, Suite "D"
Santa Barbara, CA 93105
(805) 687-4245

## DATA BASE

**FREE dBASE COMPILER**
Evaluation kit includes: demo disk with 15 PRG, 10 FMT, 5 FRM, & the results of compiling them with WordTech & Clipper. Also, complete reprints of 5 magazine reviews of both compilers including 22 benchmark tests. Also detailed Brochures with all features and limitations of both. FREE. No obligation. Call 24 hrs.

**dBASE III® Compilers**

dataBase Specialties
PO. Box 2975
Oakland, CA 94609
(415) 652-2790

**ROOTS II FOR GENEALOGY**
Organize your family tree and print camera-ready family books containing charts, text and indexes. Store, retrieve and display 1,000's of family facts with biographical sketches and source documentation. Lightning-fast searches and sorts. 250 page manual. Satisfaction guaranteed. Write for free brochure. $195 (+ CA tax)
COMMSOFT
2257 Old Middlefield Way, Ste A
Mountain View, CA 94043
415-967-1900

## DATA ENTRY

**DATA ENTRY EMULATOR**
You will not find any PC Data Entry System—FASTER, EASIER to use, or LOADED with more USABLE features. Distribution Worldwide. The EMULATOR will meet your Data Entry needs-OR-return it with no obligation. PC or DE style keyboard. Fully menu driven. Price $395. 30 DAY FREE TRIAL. Also avail. for IBM S34/36.

COMPUTER KEYES

COMPUTER KEYES
21929 Makah Road
Woodway, WA 98020
(206) 776-6443

**KEYENTRY III™**
Whether just starting, or replacing keypunches, 3741s or dedicated systems... You won't see the full potential of PC-based data entry until you see KeyEntry III, *the* premier data entry system for PCs. $395 to $895 version/quantity dependent. Complete Evaluation Package just $42.50 delivered. To order, or for information, call now.
SOUTHERN COMPUTER SYSTEMS, INC
2732 Seventh Avenue South
Birmingham, AL 35233
(800) 533-6879 or (205) 251-2985

## DATA ENTRY

**VDE—Viking Data Entry**
The premier data entry system. Full-featured to replace key punch & keydisks. Full screen "FORMS," double-key verify, wide variety of options, crossfoots, subtotals, batch balancing, duplicating, statistics, skipping, etc. Character, field & record level validations. $120-600. Also for minis.
VIKING SOFTWARE SERVICES, INC
2815 East Skelly Drive, Suite 816
Tulsa, Oklahoma 74105
(918) 745-6550

**ROOE/PC DATA ENTRY SYSTEM**
Top-rated PC data entry software. Fastest and easiest to use. Extensive features to meet every data entry requirement. Stand alone and LAN versions. High-speed data entry keyboard available. Demo version includes all programs and documentation. $40 ($5 shipping, CA add tax) creditable to full version for 30 days.
DPX, INC
20823 Stevens Creek Blvd., C1-C
Cupertino, CA 95014
(408) 973-9292 TELEX 701111

## DESK TOP PUBLISHING

Automatic
DeskTop Publishing

**PowerText Formatter**

Automatic text and page layout for DeskTop Publishing. Typeset ads, books, contracts, scripts, newsletters, manuals, form letters, etc. with a LaserJet, your WP program, and PowerText. Set your strategy, then publish without constructing each page. Hyphenates, justifies, puts text in columns, numbers paragraphs, produces contents and index - all with simple commands. Include pictures with our separate PowerText Graphics Module. For PC/MS-DOS with 256K.

Beaman Porter, Inc.
417 Halstead Ave
Harrison, NY 10528
(914) 835-3156
(800) 431-0007

$89.95 each $5 shipping
CIRCLE 583 ON READER SERVICE CARD

## DESK TOP PUBLISHING

**EZ-LASER**
A pop-up memory resident utility to get the most out of your laser printer. Merge graphics and text. Download fonts. Create forms. Capture and print graphics and text screens from within any program. Use with LOTUS 123, OBASE, WORD and others . . . ONLY $99.95.

JRM SOFTWARE
(703) 860-3085
PO BOX 2847
RESTON VA 22091
CIRCLE 554 ON READER SERVICE CARD

**HIGH-TECH TYPESETTING**
Transmit your text toll-free, error-free via modem to your fully automated typesetting system. $2 per thousand characters, $5 minimum. Same-day service. 200-typefaces, sizes up to 72 point. Send $20ppd. for our 200 page guidebook, or call toll-free & use your MC/Visa/AmEx.
Intergraphics
106A South Columbus St.
Alexandria, VA 22314
(800) 368-3342 or (703) 683-9414 in DC area

***TO POSTSCRIPT FROM DOS***
"How to Run PostScript Laser Printers from DOS." No other software is needed, use DOS COPY CON command and send straight to a LaserWriter. 32 sample programs, every line documented, every program illustrated. Hardware setup details. Communication and mode files. Disk and Manual $24.95. MC/VISA.
LaserSoft Press
P.O. Box 3043
Cleveland, TN 37311
615-478-3841

**LaserJet Setup Program - $49.95**
LJ SET-UP is a memory resident utility for HP LaserJet and LaserJet+ printers. Select cartridge and soft fonts. Set lines, margins, copies, paper, and other options. Download soft fonts and macros. Pop-up menus display options minimizing your need for the printer manual. IBM PC/XT/AT and true compatibles.
Management Information Software
P.O. Box 979
Mercer Island, Washington 98040
(206) 232-5626

***Low-Cost LASER Printing***
Print important ideas by modem on our LASER print system. TRY IT NOW! Dial (312) 929-9446 24hr auto-answer computers process your data and we send output directly to you or to your client. Just $.50 per Page! Select up to 10 diff fonts!
- REPORTS
- TRANSPARENCIES
- NEWSLETTERS
- RESUMES

Management Data Systems, Inc.
P.O. Box 81229
Chicago, IL 60681
***(312) 549-3058***

**HYPHENATOR**
Dictionary based hyphenation program for use with Fontasy and desktop publishing packages. Embeds "soft" (discretionary) hyphens into any ascii document. User-definable hyphen code. Batch or interactive modes. User modifiable dictionary. Great for justified and columnar text, newsletters, etc. Only $35.00!
PEGASUS ENGINEERING
24431 Island Ave.
Carson, California 90745
(213) 835-4566

**LaserJet Unlimited book**
"A big plus for anyone with a HP-LaserJet"-John Dvorak. "A fantastic resource for any laser printer owner" -PC Publishing. "Demystifies the popular printer" -Los Angeles Times. 228 pages, 45 illustrations. $24.95 plus $3.50 s/h. CA Res. add 6.5% tax. Check/Visa/MC accepted. Money back guarantee.
PEACHPIT PRESS
2127 Woolsey St.
Berkeley, CA 94705
(415) 843-6614

## DEVELOPMENT TOOLS

**CUT DEBUGGING FRUSTRATION**
T-DebugPLUS, a new run time symbolic debugger for Turbo Pascal, allows programmers to:
★ examine and change variables,
★ trace and set breakpoints,
★ view source code while debugging.
It cuts debugging frustration and enables programmers to find and fix bugs faster and easier than ever before.

T-DebugPLUS is only $60, and is complete with source code, reference card, and an 80 page printed manual. It requires Turbo Pascal 3.0 and 256K memory IBM compatible. Charge card orders toll-free at 800-538-8157 x830, 800-672-3470 ext. 830 in CA. See ads in Byte or PCTech or call 408-438-8608 for more info.

TURBO Power™

Turbo Power Software
3109 Scotts Valley Dr. Suite 122
Scotts Valley, CA 95066

**TURBO FORMS**
Bullet-Proof user data entry. Unlimited character & field level data verification. Create & edit forms for data entry & display w/o recompiling source code. Flexible formatting w/graphics, windows, colors & display attributes. IBM PC & compatibles. One of *PC Magazines* 14 Hot Turbo Utilities. $39.95 incl. S&H. MC/VISA/COD.
GREAT LAKES SOFTWARE SYSTEMS, INC
2510 Capital Ave. SW Suite 203
Battle Creek, MI 49015
(616) 962-2017

CLASSIFIED

## DEVELOPMENT TOOLS

**StruBAS**
**Structured BASIC Development Toolkit**
**QuickBASIC - IBM BASIC 2.0**

Design screens in minutes with powerful screen designer using any editor. Modify most features without recompiling. Interface to Btrieve, ISAM, and Screens with single commands. Offers program generators, menu utility, subroutine library, utility programs, network support thru Btrieve, and preprocessor to extend BASIC and enhance structure.

**NOT COPY PROTECTED**

Site and Corporate licenses available

LANEY SYSTEMS, INC.
3 Office Park Drive, Ste 100
Little Rock, Arkansas 72211
501-225-7755
VISA/MC ACCEPTED $495/$5 demo

**FREE 30 DAY TRIAL**

### BRIDGEWORKS! FOR 1-2-3

Bridge the gap between Lotus 1-2-3 and your BASIC, Turbo Pascal, dBASE, communications or other applications. READ data from and WRITE directly into 1-2-3 worksheet files. No PRN or DIF files. No file retrieve. Not copy protected. Integrate into your applications without royalty. For Lotus 1-2-3 and symphony on the IBM-PC/AT/COMP. $59.95

GreyMatter International
PO Box 1083
Setauket, NY 11733
516-689-7682

### QUICKBASIC JUST GOT QUICKER!

QuickPak is the BEST collection of programming tools for enhancing Microsoft QuickBASIC. Includes assembler routines for Windows, Sorting, Searching, DOS & BIOS services, much more. Also QuickBASIC input routines, and menu, a BASIC programmer's guide to learning assembly language, and a Tips and Tricks book. Source code included. $69 VISA/MC-M/8

CRESCENT SOFTWARE
64 Fort Point Street
East Norwalk, Ct. 06855
203-846-2500

### FORTRAN DEVELOPERS

Essentials for documenting and debugging large FORTRAN programs. *DOCUMENT'er: Prepares X-references and symbol tables for an ENTIRE program with ALL routine, COMMON,... definitions + ALL uses. *DIAGRAM'er: draws clear diagram(s) of complex code and data structures of your code. Interactive + many display options. Needs only existing source, MAP, and library files. All compilers supported. Both $128.75.

**IMPULSE ENGINEERING**

Ray Strong, (415) 788-4611
IMPULSE Engineering
P.O. Box 3540
San Francisco, CA 94119-3540

**Turbo Pascal Programmers: 15 MINUTES = 200 HOURS! with new *turboMAGIC* code generator.**

Input forms and help windows up to 66 lines long. Scrolling within framed windows. Pop-up menus. Pull-down menu systems. And **much** more!

Read what professionals say: "Fast automatic updating of dependent fields adds flair to your input screens. turboMAGIC will be a blessing for programmers who would rather not write the user interface for every program." Neil Rubenking, PC Magazine, 24 Feb. 87

Order your magic today! Just $99. Call 800 225-3165. Money Back Guarantee. Requires 256K IBM PC compatible.

**Sophisticated Software Inc.**
6586 Old Shell Road
Mobile, AL 36608
205 342 7026

CIRCLE 593 ON READER SERVICE CARD

### MICROMIND™ EXPERT .....

Development system & knowledge engineering tool. Create IQLISP based expert systems. Excellent prototyping capabilities. Includes text editor, windowing, rulebase and menus. Uses if-then-do, forward/backward chaining. $499. $25 demo. Write for catalog of 200 products.

The SourceView Corporation
PO Box 578-A
Concord, CA 94520
(415) 680-0202, (800) 682-2860 - orders only

### TURBO PASCAL GENERATOR

GTP APPLICATION DEVELOPMENT SYSTEM, ver. 2. Builds complete, working applications. You give it spec's, it writes error-free code.

- Indexed Data Bases
- Multiple Screens
- Context Sensitive Help
- Memory-mapped Video
- Global Search
- Full Keyboard Supt

Easy to Use. Price $150.00. Visa/MC, Ck, MO.

AEF, INC
P.O. Box 928
Katy, TX 77492-0928
713-391-8570

### Smart System Services ...

THE Smart System project file and application development tool. An extensive library of standardized calls and utilities. User I/O, menu generation, database, lookup, report, and transaction handling. Includes the PROJECT WRITER utility (you answer the questions, it generates the source code for your Smart project files). Call our order line today!! $119 + $3 s/h.

Check M/C or Visa ... (602) 926-7454
... Amalon Industries Inc. ...
... 725 W. Commerce 3-C ...
... Gilbert, Arizona 85234 ...

**Mach 2 Supercharges Turbo Basic**
**(similar products available for Turbo Pascal & MS/IBM BASIC)**

**Mach 2** makes **Turbo Basic** programs fly. Look what our handcrafted assembler subroutine library does:

- Instant data displays and pop-up windows.
- Use all available DOS and LIM Expanded Memory for data—no more 64K limit for strings and no DOS memory limit for numbers.
- Read and sort the file directory. Works with wild cards!
- Search the DOS path for a file.
- Read and change a file's attributes.
- Memory manager—sort, search and maintain string arrays at assembler speed—even in LIM Expanded Memory!
- Read and write files fast as DOS.
- Get and set file date and time. Get file size.
- Change screen attributes without redisplay of text.
- Controlled input routine allows full use of editing keys.
- Get the DOS version number.
- Read characters from the screen in a fraction of the time.
- Menus ala Lotus 1-2-3. Vertical bar menus, too!
- Scroll the screen in any direction.
- String functions, including comparing words by their sound!
- Large character set—5 lines by 4 columns.
- Free tech support and much, much more—only $69.

**Price Buster—Order Turbo Basic and Mach 2 for only $149!**

30 day money back performance guarantee. Not copy protected. No royalties when you distribute compiled programs. Add shipping $3 US, $5 Canada, $18 others. MC, Visa, Company COD welcome (add $3 for COD). No assembler or knowledge of assembler is required. Requires IBM or close compatible, DOS 2+ and Turbo Basic. In Georgia, add sales tax and call 404-973-9272.

**To Order: 800-922-3383**

We also have Mach 2 for IBM/MS BASIC and Turbo Pascal! We're the same company that publishes Stay-Res, Peeks 'n Pokes, The Inside Track and Screen Machine.

**MicroHelp, Inc.**
2220 Carlyle Dr. • Marietta, GA 30062
CIRCLE 405 ON READER SERVICE CARD

## EDUCATION

### GRADE WEEK VACATION!

Average and print out your grades with the fast, easy-to-use AEIUS GRADEBOOK program. New version this year. Contains many advanced features. Not copy protected. In use by teachers coast to coast. Only $49 ppd. District or school rates as low as $1. per teacher. Send for free literature. VISA or MC.

AEIUS CORP., Dept. GB
PO Box 700457
San Jose, CA 95170
(408) 257-0658

### ALGEBRA & QUIZ MASTER™

AlgebraMaster™ solves any equation, gives full explanation step-by-step. You supply the equation, or get randomly generated equations for 8 difficulty levels. QuizMaster™ does customized quiz databases, allowing random or topical quizzes. Add/delete/sort questionbase. $69.95 each or buy both-$99.95! 30 day guarantee.

Executive Mastery Software Corporation
Subsidiary of The SourceView Corporation
PO Box 578-A
Concord, CA 94520
(415) 680-0202, (800) 682-2860-orders only

## ENGINEERING

### ENG/SCI GRAPHICS

OMNIPLOT(S) (screen graphics) & OMNIPLOT (P) (plotter driver) provide integrated engineering/scientific 2-D & 3-D graphics with NO PROGRAMMING REQUIRED! Menu-driven, flexible, professional. Choice of formats: tabular/line, contour, bar, pie, 3-D wire frame & much more! OMNIPLOT(S) $195, OMNIPLOT(P), both $295.

MICROCOMPATIBLES
301 Prelude Drive
Silver Spring, MD 20901
(301) 593-0683

### STRUCTURAL DESIGN

Fast, highly interactive, integrated programs for structural analysis and design of BEAMS, COLUMNS, TRUSSES and FRAMES of any material. Easily mastered programs result in dramatic time savings while producing efficient, accurate designs. Specify PC, XT or AT and send $25 for demonstration diskette to:

C-Squared B-Squared Software Design, Inc.
763 27th Avenue Dept. A-2
San Francisco, Ca 94121
415/751-1337

### SIMULATION

GPSS/PC is a full-power version of GPSS, the most popular mainframe simulation language. Specifically designed for interactive use on today's high-speed microprocessors, it is loaded with features such as interactive graphics and animation. Using GPSS/PC, you can predict the behavior of complicated real world systems.

MINUTEMAN SOFTWARE
P.O. Box 171/B
Stow, MA 01775
800-223-1430/617-897-5662 Ext. 316

## ENGINEERING

### FINITE ELEMENT ANALYSIS

MSC, the leader in FEA technology, markets a full line of FEA tools for personal computers. Starting at $45 for MSC/pal INTRO on either the IBM PC or the Apple Macintosh, our products are designed to be complete and easy to use. Interfaces for most CAD systems available.
THE MACNEAL-SCHWENDLER CORPORATON
815 Colorado Blvd
Los Angeles, California 90041
(213) 259-3888

### SCIENTIFIC PLOTTING PKG

F-CURVE is the plotting package for engineers and scientists. A few of F-CURVE's features: plot data, smooth curve through data, or regression curves (linear or nonlinear). Draw liner, log, inverse, or power axis. Label plot. Place labels anywhere on plot. For MS-DOS and HP plotters. $49.95 VISA/MC/check.
LEDS Publishing Co., Inc.
P.O. Box 12847
Research Triangle Park, NC 27709
(919) 477-3690

### FLOW PROBLEMS MADE EASY

Fast menus allow unrelated units to be input without prior conversion. FLUIDTOOLS accepts any mix of units, calculates P, Q, L, Q, or Visc in units selected. User can Add & save additional units. Easy to learn & use. Darcy, Blasius equations. 70K, IBM PC & compatibles. $99.95 free S&H. 30 day money back guarantee.
Neat Solutions
5018 Murrayhill Rd.
Charlotte, N.C. 28210
(704) 525-5985

**PC Magazine Classified Marketplace the ultimate target market!**

The brand specifiers who read PC Magazine don't have the time to shop around, their only concern is getting what they need as quickly as possible.

**They'll DIRECT their attention to PC Magazine Classified Marketplace**

For them PC Magazine Classified Marketplace's Direct Response/ Display Ad format represents a fast, easy and cost effective method of product acquisition. They know it will have the products they need and the information they want regarding price, volume discounts, specifications and delivery.

If you think that your business can benefit from the 375,000 brand specifiers who read PC Magazine . . YOU'RE RIGHT!

**So take DIRECT action and call (212) 503-5115**

## ENTERTAINMENT/GAMES

### LOTTO NUMBER ANALYZER

Use your PC to help you win the Lotto. This fun to use program for most home computers will quickly tell you which numbers are 'due' any patterns and trends, what groups to play and more! Make your selections based on the laws of probability and INCREASE your chances of winning! Only $24.95 + $1.50 s/h.
SOFT-BYTE COMPUTER PROGRAMS
P.O. Box 556
Dayton, Ohio 45405
(513) 233-2200

### **Baseball FANatic**

Intense strategy game for 1 or 2 players. Super graphics and 4 octave sound effects, 30 actual rosters or add your own 5 levels of play to choose from. Roster disks available-you pick 30 teams. Unique package of 6 other popular features. Requires 256k - $49.95. Demo disk $5.00 refunded with 1st order. MC/VISA.
Performing Arts Software, Inc.
320 N. Bazil
Indianapolis, IN 46219
(317) 897-3591

### NFL CHALLENGE UPDATE

Replace the team data disk on your NFL CHALLENGE Game with the latest player roster and data. Revised to end of 1986 season. Requires IBM type computer and a copy of NFL CHALLENGE (copyright by XOR Corp.). Send $19.95 plus $2 shipping & handling. Texas residents add Sales Tax. MC/Visa.
HD&S SOFTWARE
P.O. Box 924183
Houston, TX 77292
(713) 688-9102

### PC/VEGAS II

Poker, Blackjack, Roulette, Keno, Slots—$26. Above plus Baccarat and Craps—$39. Exact Vegas simulation, includes Help, best bet/odds windows. Cross-game scoring. Graphics not mandatory. Color or Mono. MS/PC DOS, 128K. C Source available, ask. Add $2 for shipping/CA res. add 6½% tax.
O & H BEAR SOFTWARE
P.O. Box 10793
Marina Del Rey, CA 90295
(213) 374-0358

### SPORTS HANDICAPPING SOFT

$$WIN with thoroughbred/harness & greyhound handicapping software-$29.95, enhanced-$49.95. Up to 13 entries analyzed: class, speed, times, track lengths, post, stretch, & finish positions. Pro Football System-$39.95. Pro Basketball System-$49.95. Add $2 post/hand. MC/VISA accepted. Free information.
SOFTWARE EXCHANGE
P.O. Box 5382-PC
W. Bloomfield, MI 48033
(313) 626-7208. Orders: 1-800-527-9467

### SPACE WARP™ II-THE SEARCH

Coming Soon. Command The Crew of Your Choice. REAL*TIME Transporter. Realistic Simulation: Responding Crew Members. Infinite Universe. Colorful Animation. And More. ORDER NOW! 30-Day Money-Back Guarantee. Check or MO $29.95 + $5 s/h. Req. MS-PC, CGA, 256K.
**SPACE WARP1 $19.95 + $5 s/h (CGA not req.)
**DEMO DISK & space games FREE!! + $5 s/h
JAD-PRO
P.O. Box 4153-B
Star City, WV 26504

### TANKS: A GAME OF STRATEGY

An enemy tank division has seized and plundered a valuable city. As the leader of a patrol of tanks, you are to devise a strategy to recover the city. Realistic sound effects and great display. 15 min/game, each different. IBM & comp, DOS 2.0+, mono/color $34.95 + $3 s/h, MA res. add 5% sales tax.
Richard Z. Ward/WARDCO
88 Beacon Street, Apt. #44
Somerville, MA 02143-4338
617-491-1783 (orders only)

### TRAIN DISPATCHER

TRAIN DISPATCHER is a realistic simulation of a railroad traffic control center. It was created by designers of CTC systems for operating railroads and is used by some railroads in their dispatcher training programs. Available for IBM PC,XT,AT and Jr. for $25+$2.50 s/h.
Color Graphics card required. MC/Visa accept.
SIGNAL COMPUTER CONSULTANTS, LTD
P.O. Box 1B222, Dept. 33
Pittsburgh, PA 15236
(412) 655-7727

### MUSICAL IMAGE GENERATOR™

Super Music™ draws fast-action color graphic images to the beat of any musical input source via the built in cassette port. Many different designs are offered. Written in 100% machine language. Detailed manual provided. IBM PC w/64K or clone, disk drive (no DOS req.), CGA or EGA. Check/MO/VISA/MC. $39.95 complete.
INVENTEK, INC.
P.O. Box 366
Lincoln, NH 03251
(603) 745-3756 9am-5pm M-F (EST)

### HORSE RACING

Experience the excitement of Horseracing without leaving your home. Choose your horse as the odds board flashes the favorite and longshots. Anticipation builds as you place your bets, the horses enter the gate and THEY'RE OFF. And the winner is . . ??? IBM PC, compatibles. Check or MO $28.95+$3 s/h.
Galaxy Software
P.O. Box B303
Somerville, N.J. 08876

### USE YOUR PC TO PLAY LOTTO!

Increase your chances at winning big! LOTTO-LUCK is a computer program, designed by a computer scientist using the latest techniques of Geometrical, Kabalism and Random Relationships of numbers to give you an opportunity to predict possible winning PICK/6 lotto numbers. LOTTO-LUCK will work on any lottery, in any state or country. Runs on IBM PC, C-64 and Apple II. Send $29.95 + $3 S/H to:
WIN$WARE SYSTEMS
P.O. Box 8130
Sacramento, CA 95818
(916) 457-5535

### CASINO MASTER GAMES

Learn casino game skills w/o risk! Color displays of game tables, manuals with odds.
*Blackjack-card counting, advice disp.... $40
*Crapsmaster-multiple come, odds bets... $40
*Roulette-0/00 options, table/wheel disp. $35
*Video Poker/Baccarat-for high rollers. ea. $30
PC/comp. w/color graphics. Chk/MC/V, ppd. Compl. Pkg. only $99. Order 2 or more, get 10% discount.
HITECH MANAGEMENT CORP.
P.O. Box 2121
Boca Raton, Fl 33427
305-392-3678 (Fl.) 800-332-2049 X3017

THE SHOWCASE FOR PRODUCTS AND SERVICES IN THE MS DOS MARKET . . .

## FINANCIAL

? Simple Interest ?
Is it really Simple?

Before you buy a house, lease a car or apply for a loan or lease of any kind, you need the Loan Ranger standing behind you. The Loan Ranger helps you avoid the pitfalls built into the banking laws.

—THE LOAN RANGER™—

AUTO-EVALUATES loans and leases, from "Excellent" to "Terrible." OFFERS defaults and on-line help anytime. ALLOWS two loans to be engineered and compared simultaneously. ACCOMMODATES up to 500 modified or irregular payments. PRINTS pre-loan questionnaire (very important) and detailed amortization schedules. CORRECTS floating-point errors others just round off. COMPUTES complex loans that use various non-standard formats.

FOR IBM PC'S

To order the Loan Ranger, please write to
PRIDE SOFTWARE DEVELOPMENT CORP.
3575 N.W. 31st Ave.
Oakland Park, FL 33309

only
$99.95!

Enclose $99.95 plus $3 shipping. Florida residents add 5% sales tax. Order by phone (305) 731-4333. COD orders add $2.

Pride Software Development
Light Years Ahead

IBM is a trademark of International Business Machines, Inc.

CIRCLE 398 ON READER SERVICE CARD

## FINANCIAL

Balance Checkbaak
Organize Far Tax Time
Easy Far Hame
Powerful Far Business

VERSION 4
NOT COPY PROTECTED

**Checks & Balances™**

- Single entry occounting system centered araund the checkbook
- Handles cosh & charge transactions
- View, edit or print ony entry for o yeor with simple but powerful commands
- Balonce sheet, cosh flow and profit & loss stotments, plus many more reports
- Prints checks

CIRCLE 406 ON READER SERVICE CARD

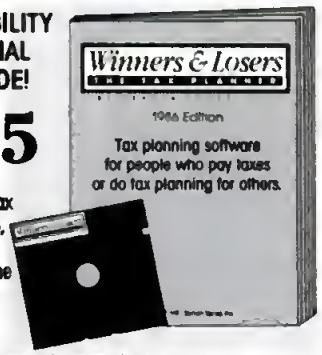
**ONLY $74.95**
$3 P/H & CA 6½% tax
VISA/MC/Check

***CALL NOW!***
**213/661-2031**
**CDE SOFTWARE**
948 Tularosa Drive
Dept. PC
Los Angeles, CA 90026

# EVERYONE NEEDS A TAX PLANNER

**Trading stocks? Getting married? Starting your own business? Buying or selling property? Considering any investment issue?**

**KNOW YOUR TAX LIABILITY WHENEVER FINANCIAL DECISIONS ARE MADE!**




**ONLY $39.95**

- All provisions of the new Tax Reform Act including 1986, 1987, 1988, and beyond
- Use year round to determine tax impact of any financial decision, or at tax time for help with your tax return
- Easy to use: step-by-step instructions lead the way
- Stand alone program for IBM & compatibles with 256K RAM

**TO ORDER CALL TOLL FREE: 800-367-3058**
415-668-1299 (CA) or send 39.95 + 3.00 S/H to: Sertan Sense, Inc., 3145 Geary Blvd., Suite 407, San Francisco, CA 94118. Check, Money Order, Visa, Mastercard accepted.

**YOU NEED**

UNCONDITIONAL GUARANTEE! If not 100% satisfied, return within 30 days for full refund.

Winners & Losers
THE TAX PLANNER
BY SERTAN SENSE, Inc

CIRCLE 408 ON READER SERVICE CARD

## FINANCIAL

**CALC - DATA CD1.0 (C)**
**HOME & BUSINESS**
Savings, Loans, Cost Schedule, Calculator, Search/List Files. Creates Reads Rewrites Adds Data to...Calculating Files; Charge Accts. Budget. Check & Bank Bal. Stmt. Inventory Tally/Expenses. Payroll. Auto & Phone File. TEXT-FILE Invoice Records Files for...Sales, Service Paymts., Credits. Help Access all segments. Sorts files. Editing. Instr. Guide Basic Programmers...List Code. PC-DOS/MS-DOS 256K Manual created w TEXT-FILE. Skilled & Novice. No Prot.

**CALC-DATA, INC.**
**460 Tamarind Dr.**
**Hallandale, FL 33009**
800-247-7893 (305) 458-0417

**COD/M.O./Cha.chk.**
**$39.95 + $5 S/H**

**APT RENTAL RECORDS (AR1.0)**
Create Files for Rentels w euto-calculation. Reed & Search
Above Program Included $44.95 + s/h
CIRCLE 407 ON READER SERVICE CARD

## GENERAL

**US$8.-per disks ???**
World's largest software library for Apple II, IIe, IIC and IBM/PC Thousands of powerful programs specially for Business, Education, Entertainment, Science You can find all of them from our Library For your complete Air-mailed catalogue send US$1 00 to
Reliant
P.O Box 33610
Sheungwan
Hong Kong

**THE RECIPE MANAGER**
Runs on IBM PCs and compatibles 128K up with PC/DOS or MS/DOS Serving size adjustment to 999 Generates shopping lists Creates hard-copy cookbook 65,000 recipes per database possible, disk space permitting 115 recipes included Indexed manual with tutorial $49 95 • $3 s/h Chk/MO/MC/VISA (MA resid 5% tax)
GEM ISLAND SOFTWARE
P.O Box 393
Reading, MA 01867 0003
(617) 944-1382

## GRAPHICS

**35mm SLiDE FROM YOUR PC**
COMPUTER SLIDE EXPRESS converts graphic files produced on the IBM PC into brilliant 35mm color slides with color resolution 400% better than your monilor Leave your printouts behind Use high resolution color slides up lo 4000 line COMPUTER SLIDE EXPRESS $9/slide
VISUAL HORIZONS
180 Metro Park
Rochester NY 14623
(716) 424-5300

**MAKE YOUR OWN MAPS!!**
MAPIT is designed lo make map making quick and easy MAPIT includes many map outline files or you can create your own MAPIT works on any printer or an HP plotter Only $95 for MS-DOS or PC-DOS MAPIT US County Outline Database available separately for $95 Call us for free sample maps & info
Questionnaire Service Co
Box 778
East Lansing, MI 48823
Phone (517) 641-4428

# ABOVE DISC A new MUST HAVE product!

Now you can have up to 8 MGB
of expanded memory available WITHOUT EXPENSIVE BOARDS.

**Above Disk** is a revolutionary new product that emulates EMS 3.2 by using Extended Memory or Disk space. Use up to 8 MGB of hard disk or use your extra floppy or RAM disk space for your programs that use EMS 3.2 or greater.

**LAPTOP OWNERS . . .**
Use **Above Disk** for large spread sheets by turning your floppy into extended memory.
**Above Disk** is super fast, and super easy to use.
It's a must have product for anyone who does serious computing.

**SPECIAL INTRODUCTORY OFFER $99**
Add $4 p/h ea. item. NV orders add 6% tax Master Charge/Visa Accepted

**- Generic Computer Products -**
Box 4436, Incline Village, NV 89450 **800/447-7775 ext. 60** In NV 800/292-0990 ext. 60

CIRCLE 569 ON READER SERVICE CARD

## GRAPHICS

### Flow Charting II+

**The New Plus for Fast Flowcharting**

FLOW CHARTING is new! It's now Flow Charting II+, with more speed + more functions + more printing options;

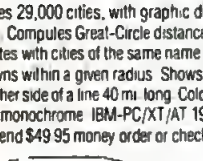
- **10 text fonts; 26 shapes;**
- **Line mode can stop at a shape;**
- **Backspace key can erase a line to its origin;**
- **Free text entry anywhere, or select auto-centering;**
- **Vertical or horizontal printing; one chart or multiple charts.**

Used by Fairchild, Bechtel and more than 500 other major corporations. Edit quickly and accurately — even major edits — with Flow Charting II+, the Specialist.

*See your retail store or call:*

**PATTON & PATTON**
Software Corporation
**800/672-3470, ext. 897** California
**800/538-8157, ext. 897** National
**408/629-5044** International
CIRCLE 410 ON READER SERVICE CARD

**US-ATLAS**
Locates 29,000 cities, with graphic display of states. Computes Great-Circle distances. Finds all states with cities of the same name. Locates all towns within a given radius. Shows towns 5 mi either side of a line 40 mi long. Color graphics or monochrome. IBM-PC/XT/AT 192K DOS 2.0. Send $49.95 money order or check.




ILLSTON PC-PROGRAMS
1932 Hayselton Dr
Jefferson City, MO 6S101
(314) 635-3417

**FORTRAN/PASCAL GRAPHICS**
GRAFMATIC (screen graphics): 75 Microsoft FORTRAN/PASCAL, RM Professional, Lahey 2.0 FORTRAN callable subroutines. Prof. graphics power backed up by a 100 pg. user manual. 5 packs in one: gen. utility, 2-D interactive, total 2-D plot support, 3-D plots, 3-D solid models (Hidden line removal). $135. H-P, H-I plotter? Try PLOTMATIC for complete plotter graphics capabilities. Intertace w/GRAFMATIC. $135. Both $240.
MICROCOMPATIBLES, INC
301 Prelude Drive
Silver Springs, MD 20901
(301) 593-0683

**PC-KEY-DRAW TRY IT $15**
Comprehensive, high-power graphics editor. CAD, paint, slide show program. Over 160 standard functions plus macros, 64 pages/layers, zoom printer, 500+ patterns, novice/expert modes. $15 includes manual, software, quick, ref. card. Register $10C for support, updates, complete printed manual. Shareware. Version 3.25.
OEDWARE
PO. Box S9S
Columbia, Md 21045-0595
301-997-9333

**GRAPHIC PRINTER SUPPORT**
At last! IBM-PC graphics support for your dot matrix printer. Use the PrISc key to produce quality B&W or color scaled dot matrix reproductions of your display on your Epson, IBM, Okidata, HP, IDS, Centronics, OEC, Anadex, Datasouth, Gemini, TI B50, Toshiba, NEC 8023, or C. Itoh printers. If your printer is not listed, let us know and we will support it. GRAFPLUS supports all versions of PC or MS-DOS and will operate with IBM (incl. EGA), Techmar, and Hercules graphics boards. $49.95
JEWELL ENERGY TECHNOLOGIES, INC
4302 Southwest Alaska St. Suite 207
Seattle, Washington 98116
(206) 937-1081, 1-800-62B-2B2B ext. 527

## INVENTORY

**INVENTORY MANAGEMENT**
Stock-Master 4.0 inventory system provides 160+ programs for Stock Status, Trend Anaylsis, Purchase Order Tracking, Quality Control Reporting, Detail Anaylsis, Bill of Materials and more. Modular system configured & "micro" priced to your needs. Cobol Source available.
APPLIED MICRO BUSINESS SYSTEMS
177-F Riverside Ave
Newport Beach, CA 92663
(714) 759-0582

**SUPER RETAILER™ is HERE!**
Find out why over 500 purchases a second are made on the finest point of sale program. Ultra-flexibility-cash returns, credit, debts,... Control your business. Keep track of your money. Inventory module—$99. Become a Super Dealer. Modules for acctng. Integrate automatically. 60 Day Money Back Guarantee. VISA/MC.
PMC
100 East 2nd Street
Mineola, N.Y. 11501
800-DIAL-PMC in N.Y. S16-294-1400

*****dFELLER INVENTORY*****
A business inventory program written in modifiable dBASE source code. The menu-driven program lets you locate items by inventory name or number. It keeps track of reorder points, vendors, average cost & other information.
*dFELLER Inventory $150/Requires dBASE II/III
*dFELLER Plus $200/with History & PO's. Requires dBASE III - III PLUS (for stock rooms)
FELLER ASSOCIATES
550 CR PPA, ROUTE 3
Ishpeming, MI 49849
*** (906) 486-6024 ***

## INVENTORY

**HOME INVENTORY**
Home Inventory (+) is a complete inventory storage & retrieval system ● Menu driven ● Easy entry & editing ● Sub-totals & totals ● Multiple searches ● Printouts ● On screen totals ● Multiple files ● Financial statement
**$47.95 complete.**
Specify DOS ver & RAM
**FREE* WITH EVERY ORDER**
*upon request
Trivia Supreme trivia game
$29.95 value
**HURD COMPUTER SYSTEMS**
6330 Lincoln Ave., Ste. 247
Cypress, CA 90630
**(714) 220-2729**
CIRCLE 412 ON READER SERVICE CARD

## LEGAL

**TABS III**
**TIME ACCOUNTING & BILLING**
**1st ABA Approved Legal Billing System.** Multiple billing formats, aged A/R, management reports. Integrates with STI's Gen. Ledger, Accts. Payable, Trust Accounting and Docket Control systems. Used by over 2,500 firms. CP/M, PCDOS, MSDOS and Novell or IBM PC Network versions available. Contact
SOFTWARE TECHNOLOGY, INC.
620 No. 48th Suite 120, Lincoln, NE 68504
(402) 466-1997
(800) 228-2028 Ext 533 (info only)
CIRCLE 599 ON READER SERVICE CARD

**ATTORNEY OFFICE PACK**
A complete office management system for money operations with time billing, autocalc, spreadsheet, finance functions, office forms, boilerplate, client track, calendar, case track, reminder, search, etc. Auto office works for small up to multi-office, partner, or individual.
Requires IBM compat. and Hard Disk.
Ask about our low cost demo.
SOFTWARE TRUST
price $2875.00
order line 1-800-624-2232 operator 777

## MAILING PROGRAMS

*****SPEEDMAIL™ $24*****
Save data entry time by using two letter codes to generate a city, state, & zip. Make mailing labels and print by name, zip, or up to 30 other ways! Great for customer lists and carrier route mailing. Fastest, easiest, best editor, function keys, & much more. Revolutionary! For IBM PC or Apple //e. Also does envelopes/cards.
AURORA SOFTWARE COMPANY
2620 Danbury Drive
New Orleans, LA 70114
(504) 391-9598

## MAILING PROGRAMS

**THE MAIL ORDER ACCOUNTANT**
Order fulfillment/List management. Includes customer lists, labels in 6 formats, inventory, invoicing, accounts receivable, customer payments by cash/credit card. Prints shipping labels, credit card slips, UPS shipping manifests, sales tax report. dBase III Plus source code provided. $750, demo $2S + $3.50 S/H.
GOLDSMITH & ASSOCIATES
48 Shattuck Square, Suite 86
Berkeley, CA 94704
(415) 540-8396

**POSTWARE MAILING SYSTEM**
Automate mail preparation. Cut postage costs by 9½¢ per piece or more. Only PostWare prints address labels in bundle and bag, bulk mailing order. Not a useless zip code sort. Prints address labels, bag tags/tray labels. Calc postage. Works with dBase III PLUS, DATABASE, PowerBase, Smart & others. Also ASCII.
★ 1st & 3rd Class—$195 ★ 2nd Class—$395
★ Carrier Route—$300 ★ PostWare Jr.—$69
PostalSoft, Inc.
515 Division St.
La Crosse, WI 54601-4544
800/831-MAIL (6245) ... ..608/784-3500

**INFORMATION MANAGER-$79.95**
Screen access and printing in one of these orders: Name, Company, State, City, Zip, List.
- Create/edit/merge information files.
- Create/edit list and label formats.
- Import/export DIF, ASCII files.
- Print lists, labels, rolodex, continuous form envelopes and other formats you define.

Requires fixed disk, DOS 2.0 or later and 192k. (ck/money order, allow 2-4 wks for delivery)
International Systems Services Inc.
PO. Box 4920
Tulsa, OK 741S9-0920
inquiries (91B) 744-852B, (91B) 744-8531

**SUPERMAIL™ ONLY $25**
This easy to use, powerful menu driven program is used by thousands of happy customers. Find names in 1-2 sec.—No sorting. Features unlimited records & labels per name AND full screen editing. Select labels by zip or name. Password protection is available. Take memos, recall them later + more! VISA/MC.
PLACE MANAGEMENT CORP.
100 East 2nd Street
Mineola, NY 11501
800-DIAL-PMC In N.Y. 516-294-1400

**CUT POSTAGE IN HALF**
Save 9½¢ or more on every piece of mail! No program to buy. No complicated bulk mail sorting procedures to learn. Simply, mail your list to us on disk. We send back to you address labels printed in bulk mailing order. Not a useless zip code sort. Bag tags & postal forms included. Just 2½¢ per record + ship. $25 min. IMB disks. 3½", 5¼", B" & 9 track tape.
PostalSoft, Inc.
515 Division Street
La Crosse, WI 54601-4544
800-831-MAIL (6245) ..... 608-784-3500 (WI)

CLASSIFIED

## MANUFACTURING

**THE FOREMAN**
- Inventory • 8 of M • Purchasing
- Invoicing/Production/Job Cost/MRP
- Interface to Solomon Accounting
- One time machine builds/Production
- Extensive cost control Standard vs Actual
- Release type orders + PO's accepted
- Requires IBM-PC, 1D MB, 256 K8

DCM COMPUTER PRODUCTS, INC
29226 Orchard Lake Rd , Suite 290
Farmington Hills, MI 48018
313-737-0808

## MEDICAL

**MEDICAL SYSTEMS WITH ECS**
All PPM products have electronic claims submission (ECS) to Medicare & commercial carriers, paper claims too
- PC ★ CLAIM $89 95, claims only
- PC ★ CLAIM w/ICD's, CPT's & HCPC codes $229 95
- PC ★ CLAIM PLUS claims only w/patient file Complete a claim in one minute $459
- THRESHOLD ★ TM $1,995 00 claims, A/R patient billing
- THRESHOLD $3,995 00 claims A/R patient billing, complete practice management, statistics, analysis
- CLAIM ★ NET Nationwide claims clearing house Full 100% credit on product upgrade

PC ★ CLAIM & PC ★ CLAIM PLUS both house 30 day money-back guarantees IBM PC/XT/AT/compatibles MS-DOS 256K
PHYSICIANS PRACTICE MANAGEMENT
181D South Lynhurst Suite 0
Indianapolis, IN 46241
(317) 248-0357
Un continental U S call (800) 428-3515
Indiana residents call (800) 792-3525

**COMPUMEOIC™**
PROVEN Practice Mngt System—in use 5 yrs Patient data management, A/R, G/L statements, insurance forms, practice analysis, word processing, recall, delinquent tracking, historical data FLEXIBLE! user designed forms/reports $4000 Training avail Dental (DentalWare™) eyecare/optometry (EyeMate™) & Vet. (VetLogic™) also avail , Dealer inquiries invited
DATA STRATEGIES, INC
332 S Juniper St , Suite 21D
Escondido, CA 92025
(619) 489-9218

**MEDICAL MGMT+E-CLAIMS**
Practice Management, Patient & Case Tracking, Super-Bills, Appointments, Electronic Claims, Communications package, Reports, Statements, Labels, Forms and much more Buy from the leader in Health care since 1977 Fully certified in all 50 states by 29 Carriers + Medicare, Blue Cross/Shield in many others
Unvair Incorporated
9024 St Charles Rock Road
St Louis, MO 63114
314-426-1099

## MEDICAL

**RX COMPLETE MEDICAL OFFICE MANAGEMENT**
**FOR IBM PC AND COMPATIBLES**

All Inclusive Package Featuring:
Patient & Case Management, Appointments, Billing, Accounts Payable and Receivable Statements, User selective Mailings, Office and Patient Reports, Insurance Forms, Practice Analysis, Historical Data/ Reports, Delinquent Tracking, Patient Recall, Automatic Data Backup, Multi Level Password Protection, User Defined Reports/ Daily/Monthly /Quarterly / Yearly

MONEY BACK GUARANTEE
Free Unlimited Phone Support
only **$495.00** all inclusive
dealer inquiries welcome
**1-800-628-2828 Ext. 774**
Mastercard•VISA•American Express•COD

**Medical Business Technologies**
15 Hilltop Drive, Weatogue Ct. 06089
(203) 674-7822
CIRCLE 415 ON READER SERVICE CARD

## MUSIC

**Tape 'N Step**
For IBM & compatibles is a sequencing software based on a spreadsheet concept Some of the features are real-time & step-time recording, 85,000 notes, 2048 tracks, crescendo/diminuendo, dynamic ctrl , delete, & copy modes, loops & nested loops & much more $150 U.S. For more information write or call
The Midi Connection
PO Box 262 Stn D, Montreal
Quebec, Canada, H3K 3G5
(514) 933-5127 Dealer inquiries invited

**SONGWRIGHT III**
MUSICPROCESSOR prints professional sheet music with lyrics Full-screen graphics editor. Transposes to any key, plays tunes Features multiple staff & voices, harmony, counterpoint bass/treble all time signatures IBM/ Epson, Star Printers. Send $49 95 + $2 s/h or write for free sample output
SONGWRIGHT
Route 1, Box 83
Lovettesville, VA 22080-9608
703-822-9068

## MUSIC

# PC+MIDI

It's a simple equation To plug your PC or PC-compatible into the modern world of music-making, use the complete line of MIDI software and hardware from **VOYETRA TECHNOLOGIES.**

- ☐ **SEQUENCER PLUS:** 65-track total MIDI recorder/editor
- ☐ **CONVERSION PLUS:** file converter for music notation programs
- ☐ **PATCH MASTER:** network organizer and sound librarian.
- ☐ **OP-4001:** PC/MIDI interface card.

*"I've never seen a more powerful, easy-to-use music and recording system bug-free."* (PC COMPANION)

# =MUSIC

For more information or your nearest dealer, contact **VOYETRA TECHNOLOGIES,** Dept C, 426 Mt Pleasant Avenue, Mamaroneck NY 10543, or call (914) 698-3377

CIRCLE 566 ON READER SERVICE CARD

## ONE-OF-A-KIND

**NEW RECIPE KEEPER**

**★Make Your Wife Happy★**
you bought a computer
**Finally**—A Program She Can Use!
Over 200 delicious recipes included
(Add unlimited amount)
Recall instantly to screen or printer
Not copy protected.
**$39.95** MC/VISA Accepted.

**Rubis's Software**
197 Beckwith Drive
Battle Creek, MI 49015
**(616) 963-1521**
CIRCLE 416 ON READER SERVICE CARD

**TERMINATOR™**
clockwork software for your pc

**The Line Between Night & Day**

Pop up a world map showing night and day, changing with the time and the seasons. Leave it running as a fascinating window on the world, or speed it up and watch time fly. Display cities, and local times or time zones. Use it within other programs as a clock or time-zone reference for phone calls. Supports CGA, EGA, or Hercules adaptors. Just $30, sales tax and shipping included.

**TRILLIUM**
3770 Highland Avenue, Suite 208
Manhattan Beach, CA 90266
(213) 545-8300
CIRCLE 417 ON READER SERVICE CARD

## PREVENTATIVE MAINTENANCE

**Memory Minder**

Memory Minder is the most comprehensive disk diagnostic program available for microcomputers. Any operator can quickly and easily check the vital operating parameters of their floppy drives, including spindle speed, head alignment, read sensitivity and others. Run Memory Minder before vital data backup operations Use it to align the drives without the use of an oscilloscope Available for IBM PC, XT, AT and compatibles. Call or write.

**J&M SYSTEMS, LTD.**
15100-A CENTRAL SE
ALBUQUERQUE, NEW MEXICO 87123
505/299-4182
We accept MasterCard and Visa
CIRCLE 558 ON READER SERVICE CARD

**MAINTENANCE & INSPECTION**
An easy-to-use computerized method to organize, operate, and control an effective preventive maintenance system Applicable to any type of business or industry. Full screen input and displays, plus function key help command Maintains historical data, creates work orders, and provides numerous reports For info, write to
PENGUIN COMPUTER CONSULTANTS
PO Box 20485
San Jose, CA 95160
(408) 997-7703

**Software Public Domain**

*begins on the following page*

## PUBLIC DOMAIN

**$4.50 IBM PC SOFTWARE**
450 disks $4.50ea. Arcade games, 4 disks $18. Utilities, 4 disks $18. 1-2-3 WKS, 8 disks $36. "C" routines, 6 disks $27. Turbo pascal routines, 8 disks $36. Unprotect software, 4 disks $18. Sample, word proc, DBMS, games & utilities, 5 disks $22.50. Catalog $1. Add $4s/h. MC/Visa.
The Computer Room
P.O. Box 1596 Dept. 104
Gordonsville, VA 22942
703-832-3341 (M-F 10-5)

**$3.00 SOFTWARE FOR IBMPC**
Hundreds to choose from, wordprocessors, data bases, spreadsheets, assorted games for all ages, communications, business, music, art, programming language and useful utilities for making your computer easier to learn. Most programs have documentation on the disk. Write for your FREE catalog today!
BEST BITS & BYTES
P.O. Box 5332
North Hollywood, CA 91616

## REAL ESTATE

**MANAGEMENT & ANALYSIS**
* "Real Property Management" $395/$595 for residential & commercial properties and other bkkp'g. Flags delinq't tenants, prints budgets, checks, invoices & 1099S. No retyping of recurring data. * "Real Analyzer" $195, when deciding buy/sell, exchange, or refi. 30 DAY MONEY BACK.
REAL-COMP INC.
P.O. Box 1263
Cupertino, CA 95015
(408) 996-1160

**Real Estate Matchup®**
REM™/An Enable™ (Editor's Choice, PC Mag.) template. Software for any single or multiple realty office, USA. Handles multiple listing needs. Matches and manages listings/prospects for all property types; also sales, rentals, closings, bookkeeping, etc. REM and Enable for $895. Orders and info: 803-878-2100
REM
102 Court St.
Pickens, SC 29671
800-634-3470 (Nat.) Enable info.
800-551-1004 (N.Y.) Enable info.

**PC REAL ESTATE SHAREWARE**
A decision tool for brokers, investors, and those who would like to learn.
Perform investment analysis and forecasts of residential income and commercial properties. 1986 tax changes with transitional rules. (don't worry, we've made this easy)
SHAREWARE - OK TO COPY AND SHARE
$10 for complete software and quick guide
$75 for full membership (manual, tax updates, phone support, customized hardcopy)
SHAREWARE SOFTWARE
731 PACIFIC #41
San Luis Obispo CA 93401
(805) 541-6051 24hrs VISA-M/C

## REAL ESTATE

**PROPERTY MANAGEMENT**
Comprehensive program for managing residential and commercial properties. Many management reports including operating statement, delinquent rent, lease expiration and transaction register report. Provides check writing, check reconciliation, posting of late fees, recurring expenses—$395. Investment Analysis—$245
YAROI SYSTEMS, INC.
3324 State St., Suite "O"
Santa Barbara, CA 93105
805-687-4245

**COMPLETE PROPERTY MGR II**
Auditor Approved Integrated General Ledger, Accounts Payable, Aged Receivables, Tenant & Property Data Base, Report Generator and all the necessary audit traits not usually found. CPM II has the power of $2500 programs for only $795. Easy to use plus 30 day guarantee! Demo Available.
!SOLUTIONS! PUBLISHING INC.
8016 Plainfield Road
Cincinnati, OH 45236
(513) 891-6145

**"LOAN AMORTIZATION"**
AmPack is the standard amortization program used by CPA's, lawyers, investors, & business around the country. Designed for simple & complex loans. Generates customized schedules & lets you save client data. Handles most types of loans easily. Business Professionals prefer AmPack!! $49.50-Visa/MC. $5 s/h.
Softflair, Inc.
2100 West 53rd St.
Minneapolis, MN 55419
"(612) 924-3404 "

**$$ INVESTMENT ANALYSIS $$**
No one makes analyzing income producing property easier (free demo) with such price-performance comfort at $170. Stand alone, fully compiled, loan amort. and deprec. schedules, 1986 tax changes, custom features. Cash flow and detailed sale analyses uncover buy/hold/sell/refin./exch. decision insights.
The SOFT ESTATE
660 Stanford Lane
Buffalo Grove, IL 60089
" (312) 259-6301 "

**REAL ESTATE TEMPLATES**
For Lotus 1-2-3 or VP-Planner. Complete 10-year sensitivity analysis/cash flow projections for income property, res/non-res. Also includes Lease Analysis, annual operating statement, amortization schedules and wrap-around mortgage analysis. Professional quality reports $189 + $6 s/h. 30 DAY MONEY BACK GUARANTEE.
REALTECH SYSTEMS
406 South Bascom Ave., Suite 223
San Jose, CA 95128
408-294-4420

## RELIGION

**PowerChurch Plus!™**
Fast, friendly, reliable church administration system. Full fund accounting, mailing lists, membership, contributions, attendance, word processing, accts payable, payroll, multi-user support, and much more - all for $495 complete. Uses up-to-date software technology. Unlimited capacity. Full working demo $10. Call today.

**CHURCH SOFTWARE**

F1 SOFTWARE
PO Box 3096
Beverly Hills, CA 90212
(213) 854-0865

**HEAVEN CENT™ SOFTWARE**
All information in a single relational data base. Handles membership, income, pledges, budgets, attendance, disbursements, labels, etc. Supports church administrative and financial needs. For IBM PC & compatibles (512K + Hard Disk). Total price only $495. Trial program available for $25.
Stein Enterprises, Ltd.
1606 Evers Drive
Mc Lean, VA 22101
(703) 556-0458

**PARISH DATA SYSTEM™**
Comprehensive census/contribution program. Easy to operate, menu driven. Family, member, financial info & reports fully integrated. Selective lists, labels, contribution/tuition statements, personalized letters. User can create own reports, letters. Other church programs available. Over 1600 users. Free info.
Parish Data Systems, Inc.
3140 North 51st Avenue
Phoenix, Arizona 85031
(602) 247-3341

**AOAM Church Management Sys.**
is an integrated eight module system that was designed from scratch to be the most comprehensive, yet easy to use, church management system ever. Not only is it easy to input the data, but more importantly it is also easy to extract only the data you want to see the way you want to see it, via menu driven report generators. FREE information packet.
AdamSoft, Inc.
115 N. Neil St.
Champaign, IL 61820
CALL TOLL FREE ..... 800-637-4984 .....

**MEMBERSHIP MIRACLE**
Top of the line, full function, church mgt. system. Full support for membership, prospecting, contributions, customized mailing, word processing, and accounting. Powerful fund drive support speeds economic payback. On-line help functions. For IBM XT/equiv. Free tutorial disk. Full demo $35. Call
" Elegant Solutions
" 2577 North Downer Ave. Suite 210
" Milwaukee, Wisconsin 53211
" (414) 332-0774

## SALES MARKETING

**SALES MANAGEMENT**
Follow up your sales leads with *FOLLOW-UP*. Track prospects by area, dollars, products or any of 22 other fields. Sales forecasts and call reports. Labels & mail-merge in Zip Code order. Has built-in calendar, do list, and calculator. Data is password protected. PC & APCCII. Visa/MC $89.95

FOLLOW-UP

XYCAD GROUP
1577 St. Clair Ave.
Cleveland, OH 44114
800-428-8457
In Ohio (216) 589-5788
CIRCLE 571 ON READER SERVICE CARD

**MFG REP TRACKING SYSTEM**
OUORTS™ Tracks quotes and orders through quoting, shipping and payments cycle. Generates 54 reports ranging from expected commissions to sales analysis and interfaces to spreadsheet for custom reports. OUORTS has a mail list for labels, rolodex cards & mass mailings. IBM PC & compt. w/HD Dsk, Sgl user or multi-user.
KO SYSTEMS
160 Hampton Rd.
Sharon, MA 02067
617-784-4390/DLR INQ Invited

## SCIENTIFIC

**HP-PC HYPER-CALCULATOR**
A pop-up emulation of the HP-11C programmable scientific calculator integrates with every program you use. Features two-way data transfer, program and data storage on disk, on-line HELP, hex/oct/bin arithmetic, 100 registers, 1000 program step, alpha numeric prompts. Include free 8087 version and utility programs. $39.95 plus $1 shipping.
SUNDERLAND SOFTWARE ASSOCIATES
Post Office Box 7000-64
Redondo Beach, CA 90277
TOLL FREE (800) 628-2828 ext. 502

THE SHOWCASE FOR PRODUCTS AND SERVICES IN THE MS DOS MARKET . . .

## SECURITY

**ADVANCED COPY PROTECTION**

Free Demo Diskette

The world's leading software manufacturers depend on Softguard copy protection systems.

Now Softguard introduces the Protection Kit – a complete software duplication and copy protection system for your IBM-PC. And it's invisible to your end-users!

- Hard disk support with install/uninstall.
- No special media required.
- No source code changes.
- Stops all copybusters.

Macintosh Copy Protection also available

SOFTGUARD

Systems Incorporated
2840 San Tomas Expy., Suite 201
Santa Clara, CA 95051
Call 408/970-9240
CIRCLE 500 ON READER SERVICE CARD

**EVERLOCK COPY PROTECTION**
Designed for user-transparency, clone compatibility & strength. It features.
–no I/O plugs or special media
–FULL hard disk & cartridge support
–file-server network support
–variable number of installs (0-99)
–demo diskette option with unlock
–protected upgrades by modem/BBS
All this for $495 with no meter counts
Free info & demo disk.
(Duplication Services also available.)

Az-Tech Software, Inc.
426 Grandview
Richmond, MO 64085
(816) 776-8153

**"NEW" BIT-LOCK® SECURITY**
Piracy SURVIVAL - 4 YEARS proves effectiveness of powerful multilayered security. Uses rapid decryption algorithms and small reliable port transparent security device. NOW AVAILABLE for PARALLEL or SERIAL port. NEW KEY-LOK™ security device available at HALF-PRICE.
MICROCOMPUTER APPLICATIONS
7805 S. Windermere Circle
Littleton, CO 80120
(303) 798-7683 or 922-6410

## SHAREWARE

**GREAT SOFTWARE, CHEAP!**
Only $5.95 per disk for absolutely smashing Shareware and Public Domain programs! Money-back guarantee. PC-Outline, AutoMenu, PC-Key Draw, PC-DeskTeam, PC-Write 2.7, DOSamatic, Utilities Galore plus Databases, Arcade and Adventure Games. Lots more! IBM PC, PC jr, and compatibles.
Send for free catalog.
SHAREWARE EXPRESS
31877 Del Obispo, Suite 102 W
San Juan Capistrano, CA 92675

## STATISTICS

**SIGSTAT**
SIGSTAT includes over 70 programs of the BMO statistical series, plus many advanced new features. Mainframe capacity (up to 80 var.) for uni—(e.g., ANOVA, regression) + multivariate (e.g., canonical, factor) analyses, time-series, multidim scaling, crosstab, plots, q/c and more. 8087 support opt. 256K, DOS, $595.
SIGNIFICANT STATISTICS
3336 N. Canyon Road
Provo, UT 84604
(801) 377-4860

**P-STAT®**
Full mainframe package for IBM PC/XT/AT & compatibles. Combines data & file management, data display, statistical analysis, report-writing & survey analysis in a single package. 4GL programming language, online HELP, menu or command driven with interactive EDITOR.
$95 demo and Site License available.
P-STAT, Inc.
471 Wall Street P.O. Box AH
Princeton, NJ 08542
609-924-9100/Telex 466452

**DYNA-STAT PROFESSIONAL**
The most widely acclaimed Apple statistics program is now available for IBM PC/XT/AT and compatible users with:
- More Statistics—factor, discriminant, covariance, repeated measures, stepwise regression
- More Variables/Cases—100/OVER 16000
- More Speed/Flexibility—Full function key use
- More Integration—ASCII and DIF interface

A $495 program at our low Apple price of $195.
DYNAMIC MICRO SYSTEMS INC
13003 Buccaneer Road
Silver Spring, MD 20904
(301) 384-2754

**WISARD FORECASTER**
A time series forecasting package. $99. Exchanges data with Lotus. Expert systems logic automatically makes projections. No knowledge of statistics needed. Works without Lotus, too.
IBM PC/XT/AT. Also available:
Wisard Professional Forecaster, $249
Wisard Commercial Forecaster $1,995
WISARD Software Company
Dept. 410, P.O. Box 19730
Green Bay, WI 54307-9730
(414) 436-2341

## STATISTICS

**StatPac Gold™**

Buy the best statistical and forecasting package available. Complete and easy to use.

Call for free descriptive brochure:
**1-800-328-4907**

WALONICK ASSOCIATES, INC.
6500 Nicollet Avenue S. Minneapolis, MN 55423
(612) 866-9022
CIRCLE 399 ON READER SERVICE CARD

**THE SURVEY SYSTEM**
An easy to use menu driven system for the entry, editing, processing and presentation of questionnaire data. The system can produce camera ready crosstabs and other tables in banner format. Also, statistics and bar charts. Regression and open-end coding analysis options available.
CREATIVE RESEARCH SYSTEMS
1649 Del Oro
Petaluma, CA 94952
(707) 765-1001

**STATISTIX™-Only $75!**
STATISTIX is a powerful and very easy-to-use interactive statistical system for micros. Used by many major universities, businesses, state governments, and research organizations. Please check us out before you buy a statistics program. you'll agree SX is a "best buy!" SATISFACTION GUARANTEED–For more info
NH ANALYTICAL SOFTWARE
801 West Iowa Avenue
St. Paul, MN 55117
(612) 488-4436

**BASEBALL * * BOWLING**
BASEBALL LEAGUE STATS-maintains a full set of batting, fielding and pitching statistics and complete game by game histories.
BOWLING LEAGUE SECRETARY-maintains and updates all necessary records for teams and individuals in small or large leagues.
Baseball-$39.95 Bowling-$44.95 Visa/MC.
Mighty Byte Computer, Inc.
6040 A Six Forks Rd., Suite 223F
Raleigh, North Carolina 27609
1-800-237-7072

**NCSS—$79**
Easy-to-use menus & spreadsheet. Multiple & Stepwise regression. T-tests. ANOVA (up to 10 factors, rep. measures, covariance). Forecasting. Factor, cluster, & discriminant analysis. Nonparametrics. Chi-square & Cross Tabulation. Plots: histograms, box, scatter, stemleaf. Sort. Subset. Transformations. Reads ASCII from Lotus, Dbase, etc. 250 page manual. 30-day money/back guarantee. VISA/MC.
NCSS-PC
865 East 400 North
Kaysville, Ut. 84037
Phone 801-546-0445

**STATISTICS CATALOG!**
If you need statistics for IBM PC or Apple II, call us and let our technical advisors help you find the statistics programs you need. Write or call now to get a FREE catalog of statistics software.
HSD
9010 Reseda Blvd., Suite 222
Northridge, CA 91324
1-800-451-3030(NAT) 1-818-993-8536(CA)

**NEW TRUE EPISTAT!**
Professional stats can still be friendly, compiled, fast, data files up to 10,000 rows. Over 100 procedures, supports, Hercules mono, CGA & EGA color, 8087/80287 SOF data files. 25 graphs, 250 page typeset manual, over 100 examples on disc. Formulas, references for every test. Not copy-protected.
EPISTAT SERVICES
2011 Cap Rock Circle
Richardson, Texas 75080
(214) 680-1376

**SAS-like Power on 256K PC**
BASSBase runs many SAS programs on a 256k 2 floppy PC. BASSStat adds an expanded stat pack. BASSView gives a true windowing environment. SAS a SAS Institute tm. BASSBase-$95 Thru 6/30/87 BASSBase/View-$149
BASS Base/Stat $159. All three-$199
BASS Institute Inc.
P.O. Box 349
Chapel Hill, NC 27514
919-489-0729
8 8 919-489-9665 (N,8,1)

**STAT PLAN III**
Easiest to use statistics program available. Complete range of statistics-curve fitting, crosstabs, correlation, multiple regression, T-tests, etc. Graphics with printer/plotter out-put. Capable of handling over 60,000 data points. Interfaces directly with lotus files. Demo diskette available. MC/VISA. Only $179.
THE FUTURES GROUP
76 Eastern Blvd.
Glastonbury, CT 06033-1264
(202) 633-3501

**STAT 1—By Sugar Mill**
Friendly menu-driven package on 2 disks with Help, full screen data & text editor, algeb. transforms, import & export data, save results, descriptive, table, n-way ANOVA, ANCOVA, MANOVA regression w. resid., smallest space & factor analyst. Step-by-step examples in manual. $129.95 Airmail worldwide. 30 day return.
SUGAR MILL SOFTWARE CORP.
1180 Kika Place, Kailua Hi 96734
808-261-7536, 808-396-2366
1-800-367-8047 Ext. 261

**RATS! Version 2.0**
RATS, the best selling Econometric software package, now includes daily and weekly data, a new easier to use 500 page manual, and many advanced features. Use RATS for time-series and cross section regression, including OLS, ARIMA, VAR, logit, and probit. IBM PC or compatible. $200. MC/ViSA. Call for brochure.
VAR Econometrics, Inc.
PO Box 1818
Evanston, IL 60204-1818
(312) 864-1910

## STATISTICS

**Pick & Choose for Your PC**
BMDP Statistical Software offers 40 programs for data analysis. But you can choose any combination to suit your needs. From simple statistics and plots, to 1-tests, ANOVA, ANCOVA, stepwise regression, time series, frequency tables, survival analysis and more! Call for your free catalog. Hard disk req'd

BMDP

STATISTICAL SOFTWARE

BMDP Statistical Software, Inc
1440 Sepulveda Blvd
Los Angeles, CA 90025
(213) 479-7799

## TAXES

**INCOME TAX SOFTWARE**
TAXMASTER LOTUS 123 spreadsheet templates to calculate your 1986 Federal Income Tax plus a look at 1987 & 1988 tax changes. Lots of Forms and Schedules. Easy to use. IRS accepted printout. $50.00. Quick Delivery. APPLEWORKS, Mac/EXCEL versions too. VISA/MC. Orders: (800) 826-7146. UG/Dealer discounts.
ISLAND COMPUTER SERVICES
3501 E. Yacht Drive
Long Beach, N.C. 28461
(919) 278-9483

**AM-TAX**
Last year's shareware hit has a new name! Easy to learn and use. Handles 1040, 2106, 2119, 2441, 3903, 4136, 4562, 6251, A-G, R, SE, W. Some multiple. FAST!! Under 2 seconds for complete recalculation. Pop-up calculator. IRS-appr printouts, overlays, pre-printed forms. Laser interface extra. MC, VISA, or check-$45. NY-$30 each.

AM-Tax

AM SOFTWARE
P.O. Box 16706
Kansas City, MO 64133
(816) 241-0014 for credit card orders.

**FLEXTAX**
1987 ESTIMATOR & PLANNER
A Comprehensive LOTUS 1-2-3 Template
RAM Req. 1A-256K, 2.0-384K.
Macro-Menu Driven. On-screen help.
Easy data entry. Automatic Tax Calculation.
Check, Money Order or MasterCard/Visa. Price includes Tax & Postage. $29.00
Flextax, Inc.
P.O. Box 690705
Houston, Texas 77269-0705
Phone: AC713/537-6922

**** WHITE'S TAX TESTER ****
CPA created, 123/SYMPHONY TAX REFORM PRIMER to test '86, '87 & '88 taxes. CALCULATES FROM UNADJUSTED DATA.
- 1040 TAXES, any filing status
- 3 year side by side report
- Itemized vs. standard deduction
- Passive loss limits on multiple transactions
- Real Estate loss & credits allowed
- Tax credit & IRA limits
- Earned income credits

Specify 123 or SYM. $39. Check.
WHITE'S TAX TESTER/MARK WHITE, CPA
3154 S. Pulaski, Chicago, IL 60623
**(312) 247-6751**

## TERMINAL EMULATION

**BARR/HASP INTELLIGENT RJE WORKSTATION**
Hardware and software communications package for IBM PC, XT and AT. Simultaneously transmits data to host and receives output directly to MVS/JES2, MVS/JES3, VM/RSCS, and CDC/NOS, bypassing TSO and CMS. Emulates IBM 3777-2 and HASP on IBM 360/20. Line speed: 1,200 to 19,200 baud (56,000 bps on AT). Supports multiple high-speed printers beyond 2,400 lpm (6,000 lpm on AT). Features: concurrent DOS, LAN support, printer forms control, plotter support, unattended operation, easy installation. $1290. Includes Hardware & Software.

BARR

BARR SYSTEMS, INC.
2830 NW 41st Street, Building M
Gainesville, FL 32606
(800)-BARR-SYS/(904) 371-3050

**34 TERMINAL EMULATIONS**

**Softerm PC,** an advanced communications package, includes 34 terminal emulations such as:
- DEC VT102, VT220
- IBM 3101-20 (block mode)
- HP 2622A • VIP7801, 7803
- DG D200, D410 ... and more.

*Guaranteed Compatibility!!*

**Supports** Disk Capture, Background & Concurrent Communications, Kermit, Xmodem, Softkeys, Script Files & More.

For the IBM PC/XT/AT, DG, Tandy, NEC, TI, Zenith, Wang, & Others
$195 MC-VISA-COD
**SOFTRONICS**
1-800-225-8590 Dept PT
**Call for Information**
(303) 593-9540 Telex 450236
CIRCLE 400 ON READER SERVICE CARD

## UTILITIES

**FOR OPTIMAL DISK PERFORMANCE**

Vopt™ DISK ORGANIZER

**FAST, EFFICIENT** — *Vopt* organizes your disk into contiguous files for fast, afficiant, time-saving use! Initiel organization averages under 5 minutes, daily runs under 1 minute! *Vopt*'s ramarkable speed comes from its "best fit" elgorithm — it won't make a move unless it improves disk organization.

**CONVENIENT** — Run it from your autoexec.bat file.

**SAFE** — *Vopt*'s contiguous files ere easier to recover if eccidantally deleted! *Vopt*'s speed allows files to be moved one-at-a-time, rather than taking chances on disk retiability. Detects and maps bad sectors.

**MANY ADDITIONAL FEATURES** — *Vopt* includes Vmap for graphic displays of HD storage utilization—Vseek for HD seek times—Vmarkbad scens HD to flag bad clusters—Vbench to benchmark your system—Vspeed displays floppy speed, sector spacing—Vrd displays diskette errors—Vprtsc speeds PrtSc operation—Vtsr displeys current ective terminate-and-stay-rasident programs.

**FAST ORGANIZING FOR FASTER DISKS**

**GOLDEN BOW SYSTEMS**

**$49.95**
Add $3 Shipping/ Handling
6% Sales Tax in California

2870 Fifth Ave., Suite 201
San Diego, CA 92103
**619/298-9349**
Dealer Inquiries Invited

CIRCLE 572 ON READER SERVICE CARD

***** MENU INGENUITY *****
**** WINDOW INGENUITY ****
Easy setup, yet powerful MS/DOS menu system. Run any program, batch file, or DOS command from a menu. Use function keys OR type menu items! Many features, ($59.95)! Also try our multi-window file-viewing utility. View four files in full, partial windows, ($30.00). And CHESS INGENUITY, ($39.95)! All three, ($99.00).
CICA INC. (Comp. Ingenuity Consult. Assoc.)
4513 Flintlock Drive
Louisville, KY 40216
(502) 448-2719 Dealer inquiries welcome

**MORE MEMORY $25**
Couldn't you use more memory? VRAM™ gives your PC/XT/AT 8 megabytes of memory by turning disk space into expanded memory! Use PC/AT extended memory cards for expanded memory. Create VERY LARGE worksheets. Never run out of memory. Use with 1-2-3, Symphony, and other EMS programs. 30-day money-back guarantee.
BIOLOGIC COMPANY
11982 Coverstone Hill Circle, Ste 1622
Manassas, VA 22110
(703) 368-2949/Chk-VISA-MC

**SPEED DISK I/O THROUGHPUT**
QUICKCACHE—Intelligent disk I/O management subsystem for PC/MS-DOS 2.xx & 3.xx. Capable of making programs run up to 14 times faster. All parameters dynamically alterable. LIM memory supported. 40 KB min. required. $49.95 + $5 s&h. VISA/MC. 30-day guarantee.
P.R. GLASSEL AND ASSOCIATES, INC.
30255 Fir Trail
Stacy, Minnesota 55079
(612) 462-1337

**COPY II PC**
Back to most protected software quickly, easily. Run many programs from your hard disk without a floppy in drive A! (Call for list.) For IBM PC/XT/AT some compatibles. Updated regularly. Not copy-protected, of course! (also available for Apple II, Mac, C64/128, Atari ST.) $39.95 + $3 s/h. VISA/MC/ck.

Central Point Software INCORPORATED

Central Point Software, Inc.
9700 SW Capitol Hwy, #100
Portland, OR 97219
503/244-5782

CLASSIFIED

## UTILITIES

**Hard Disk Partitioning Software**

**Breaks the 32 MB Barrier... EFFORTLESSLY!**

- For PC-ATs, XTs, and compatibles.
- Creates multiple DOS partitions, up to 2,048 MB each.
- Supports ST412, RLL, ESDI and SCSI controllers.

**$79**

*"SpeedStor software makes installation simple and painless...its user interface is a joy to work with."* -PC WEEK

- Recommended and used by major disk drive, controller, LAN and PC manufacturers.
- The industry standard: over 100,000 units sold.

NEW **Now includes SpeedCache caching software and Disk Drive diagnostics ....FREE**

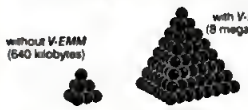
STORAGE DIMENSIONS
*The Experts in High Capacity PC Storage*

(408) 395-2688
981 University Ave
Los Gatos, CA 95030

CIRCLE 403 ON READER SERVICE CARD

5533

**Ammunition to conquer your biggest problems!**




- The Virtual Expanded Memory Manager provides your EMS applications with up to eight megabytes of expanded memory
- It turns PC/AT extended memory into expanded memory
- It turns hard disk storage into expanded memory
- It's compatible with most EMS applications including 1-2-3, Symphony, and Reflex
- *Only $89.95 30-day money-back guarantee*

V-EMM™
Fort's Software
P O Box 396
Manhattan, KS 66502
(913) 537 2897

CIRCLE 581 ON READER SERVICE CARD

**On-Line Help**
Allows you to easily add help windows to your programs Contains 8DTH memory resident 'pop-up) and CALLable help facilities You have complete control over the help window content, size, color & location Your original screen is automatically restored Call or write for more info. $149 Demo $10 apply toward purchase
Opt-Tech Data Processing
PO Box 678
Zephyr Cove, NV 89448
(702) 588-3737

***** IBM Uses CP/M & Apple *****
"The best", "strongly recommended" - PC mag
• Uniform copies files, reads & writes *directly* to 200 CP/M disk formats on the PC,XT,AT - by Micro Solutions $59.95 + $3 S/H
• MatchPoint 1/2 card transfers Apple DOS, SOS, CP/M and ProDOS files to IBM PC,XT,AT - $185 + $3 S/H (includes FREE Uniform!)
Blue Heron
1108 S Second St
DeKalb, Illinois 60115
(815) 758-2355

**FirstMenu**
Eliminate the intimidation too often associated with computers! Run programs, batch files, and utilities with a single keystroke from this true DOS shell menuing system Features unlimited and nested menus, user defined help, multi-level passwords, full screen editor, on-line DOS help more! MC, Visa & AE welcome Add $5 S/H

HARVEY™

Harvey Software
PO Box 06596
Fort Myers, FL 33906
To order (800) 231-0296, In FL (813) 482-8600

**Opt-Tech Sort/Merge 3.0**
Extremely fast Sort/Merge program Run as a DOS command or CALL as a subroutine Unlimited filesizes, most languages, datatypes & filetypes supported including Btrieve and dBASE II & III. Advanced features include record selection, record reformatting & much more! Call or write for more info MS-DOS $149 Zenix $249
Opt-Tech Data Processing
PO Box 678
Zephyr Cove, NV 89448
(702) 588-3737

**DISK ACCELERATOR V2.0**
DiskCache speeds up your hard disk access Disk caching and ram disk in one package Ram disk shares cache space Transparent flexible, configurable, no h/w changes RAM, EMS, and AT extended memory versions incl Not copy protected VISA, MC, volume discounts No PO's w/o prior approval $49.00
DATAMORPHICS LTD
PO Box 820
Stittsville, Ontario, Canada K0A 3G0
Or call (613) 836-2670

**Menu Plus+™ $39.95**
Access software on your hard disk with a single keystroke Does more, easier to use and costs less than other menu systems Plus you get easy DOS commands, a batch file editor, parameter passing, and much more IBM XT, AT, Compaq DOS 2.0 and up 256K MC/VISA $39.95 + $4.00 s/h
Sigma Software, Inc
1009 Sullivan Avenue
South Windsor, Ct 06074
(203) 644-4709 or (203) 644-9689

**DOS PATH Command for Data**
Now Lotus, dBase, WordStar, etc can access data files no matter where they're located DPATH+ works like DOS PATH command—up to 128 dirs can be searched Handles output files, file aliasing and virtual disks too Wildcards ok Transparent Requires only 4K MS-DOS 2/3 $45 + $5 s/h Md add 5% Visa/MC/check/PO
PERSONAL BUSINESS SOLUTIONS INC.
PO Box 757, Dept 8
Frederick, MD 21701
301-865-3376

**Golden Retriever™**
Search & Retrieve Text using Artificial Intelligence

How many times have you gone through scores of files one by one looking for the information needed so much?

"Born" with Text Pattern Recognition ability, Golden Retriever helps you scan files and locate data even if you're not sure of the EXACT phrase to search for!

If you ask it to locate the phrase
**"Where's the beef"**
it will also recognize similar phrases like:
"where is the beef",
"where is my beef",
"where are the beeves",
"where's the beefsteak"
Nothing important will ever be missed!

It's packed with powerful features.
- searches a single file, a selected group of files or all files on the entire disk.
- Lets you examine the file(s) Highlights phrases where they appear Lets you extract portions of the file for further processing.
- Searches word processor files, spread sheet files, data base files, and binary files.
- No file indexing nor preparation is needed prior to the search
- Menu driven Help key is always available
- Powerful command line options.
- And much more!

Boost up your efficiency!
Order your GOLDEN RETRIEVER today!
Let it do all the "sniffing" for you at electronic speed!
Don't miss it when you need it the most!

Golden Retriever is "trained" to work with DOS 2.0 or higher on IBM PC, XT, AT or compatibles. Not copy protected. Regular price $99.00

Introductory offer $79.95 + $5.00 for shipping and handling. MA residence add 5% sales tax.

SK•DATA INC 617-229-8909
P.O Box 413 • Burlington, MA 01803

CIRCLE 501 ON READER SERVICE CARD

**SS! 1 Screen Saver! $19.95**
Protect your CRT screen from image burn-in with SS!1, the automatic RAM resident screen saver. CRT blanks after user defined time limit, instantly restored at the touch of a key Hot-key toggles screen on/off DOS 2/3, 528 bytes. $19.95 + $3 s/h, CA add 6.5%
KITT SOFTWARE
Dept AD1
2210 Wilshire Blvd., Suite 713
Santa Monica, CA 90403
213-452-9144

**VCACHE GETS YOUR DISK MOVING!**
Hard disk accelerator increases speed of cartridge and fixed disk operations using memory caching to eliminate repetitive disk access Allocate up to 15 Mb of extended or expanded memory, or 5 Mb of standard memory for caching disk data Includes diskette and screen accelerator modules Automatic and transparent after installation $49.95 + $3 shpg, CA tax

GOLDEN BOW SYSTEMS
2870 Fifth Avenue, Suite 201
San Diego, CA 92103
619-298-9349

## UTILITIES

### HARO OISK EXPANSION

Oisk Manager allows the installation of any ST506 hard disk on PC,XT,AT and compatible Volumes up to 256mb! Menu driven/auto install, compatible w/all vers of MS/PC DOS (does not modify DOS), up to 16 volumes, easy to use! $125 + ship Ask about Novell product! Dealer inquiries invited

ONTRACK COMPUTER SYSTEMS INC.

ONTRACK COMPUTER SYSTEMS, INC.
6222 Bury Drive
Eden Prairie, MN 55344
••(800) 752-1333••/••IN MN (612) 937-1107••

**MAKE YOUR PC SEEM LIKE AN AT!**

**MAKE YOUR AT SEEM LIKE A DREAM MACHINE!**

***FANSI-CONSOLE™***

*The Integrated Console Utility™*

**FAST, POWERFUL ANSI.SYS REPLACEMENT**

For the IBM-PC , AT, and clones
New Version 2.00 is MUCH FASTER

Now blink free scrolling on CGA!
Now use EMS for scroll recall!
New option menu program!

- •Speed up your screen writing
- •Extend your ANSI.SYS to full VT100
- •Scroll lines back onto screen
- •Save scrolled lines into a file
- •Add zip to your cursor keys
- •Free your eyes from scroll blinking
- •Easy installation
- •Get 43 line EGA support
- •Over 50 useful options

**"The psychological difference is astonishing"** -*Lotus* June 85 pg 8.

**"So many handy functions rolled into one unobtrusive package"** -*PC-World* Feb 86 pg 282.

**"The support provided by the publishers is extraordinary."** -*Capital PC Monitor* May 86 pg 25

**"...the best choice for improving your console..."** -*Capital PC Monitor* June 86 pg 282.

460p Manual (w/slip case) and software diskettes $75.

**Satisfaction Guaranteed! Order Yours Today!**

HERSEY MICRO CONSULTING
Box 8276, Ann Arbor, MI 48107
(313) 994-3259 Visa/MC/Amex
DEALER INQUIRIES INVITED
CIRCLE 595 ON READER SERVICE CARD

### EditingTools 2.1

A superb text editor with an elegant DOS shell. Load multiple directories as menus Edit multiple files Move text among files Don't use your PC without it Only $35 + $4S/H Optimized Turbo Pascal source code optional
Jou Laboratories
PO Box 460969
Garland, TX 75046
214-495-8862

### STOP! PC MANAGER STOP!

Do you know what your PC's are really doing? With Logit! on your PC's, you can have a minute-by minute report of what each PC is doing, and who is using it When management asks, "Do we really need more PC's?" show them the LOGIT LOG report (binary file) of each computer's activity RAM resident (10k) $39 95 + ship Co PO , CHK, MO, Visa, MC

*LogIt!*

Univ of Wisconsin Software Development & Distribution Center, 1025 West Johnson St , Madison, WI 53706
••608-263-9484••

### OISK FILE ANALYZER $20

Much wasted time results from not knowing exactly what data and control codes are in disk files Especially troublesome are files appended from other programs or other computer systems This is a great control and debugging aid Your satisfaction is guaranteed Bar Code printing programs $7 to $55
GORDON COMPANY
20210 Laceyland
Katy, Texas 77449
713-578-5522

**Run your software worry free without hardware locks or key cards.**

| | |
|---|---|
| **Auto SAFE for AutoCad** | **$95** |
| **KeySAFE for CADKey** | **$95** |
| **VancSAFE for CADvance** | **$99** |
| **NetSAFE for Novell v2.0a** | **$115** |
| **PSAFE for P-CAD** | **$99** |
| **PdSAFE for Personal Designer** | **$95** |

Call for other product availability.

**Nasdec (Manitoba) Inc.**
P.O. Box 72
Transcona, MB
Canada R2C 2Z5
(204) 663-1023

CIRCLE 401 ON READER SERVICE CARD

### SELECT: Automenu™

Create one menu system to run all your programs, batch files and DOS commands. "Insulates" novices, many options for power users On-screen help, password protection, user-defined prompts Written in assembler 16K size Over 10K satisfied users Money back guarantee.

$50, checks/VISA/MC Call or write for brochure.

*MAGEE ENTERPRISES*
6577 Peachtree Industrial Boulevard
Norcross, Georgia 30092-3798 USA
404-446-6611
CompuServe 70167,2200
FAX 404 446-7434 Bulletin Board 404-446-6650
Copyright 1987 Magee Enterprises
Automenu ™ is a trademark of Magee Enterprises

CIRCLE 402 ON READER SERVICE CARD

### Smart Directory

**You'll never use DIR again!!!**

Display one directory in two columns or two directories side-by-side Smart Directory is faster than DIR, shows more files (sorted) and allows scrolling Copy, erase, rename, transfer, browse and more Block copying, transferring and erasing Change file attributes Make, delete and rename subdirs. Display and change tree structure Help screen and novice/expert modes Complete color customization User can set defaults. For XT, AT, Compaq and compatibles. DOS 2.0 or later Only $29.95 + $3.00 s/h Ca residents add 6%.

EXTRA DIMENSIONS SOFTWARE
8 Perch, Irvine, Ca. 92714
(714) 551-2770 Visa/MC

CIRCLE 416 ON READER SERVICE CARD

### COPY AT TO A PC

Allows copying of IBM AT files for use on IBM PCs, XTs, and compatibles with no hardware or software modifications A 360K floppy drive is not required 'CPYAT2PC' may reside on your IBM AT hard disk and copies 1 file or entire subdirectories in 1 step Price $79 + $4 s h

MICROBRIDGE COMPUTERS INTERNATIONAL, INC.
655 Sky Way - Suite 125
San Carlos, CA 94070
1-800-621-0851 Ext. 777
(CA) 415-593-8777
(NY) 212-334-1858

CIRCLE 419 ON READER SERVICE CARD

### PAOLOCK/PAOLOCK II OISKS

PADLDCK furnishes the user with a method for providing protection against unauthorized duplication from DOS commands $99 PAOLOCK II disks come preformatted with finger-print and serialization PAOLOCK II disks offer superior protection Ask about our HARD DISK protection with uninstall capability MC/VISA
GLENCO ENGINEERING
3920 Ridge Ave
Arlington Hts , IL 60004
(312) 392-2492

### PRO Programmer Tools $99.

Library subroutines Saves hundreds of hours in programming and debugging No royalties * WINDDW LIB * WINOOW LIB w/dENTRY * FILES LIB * BIOS LIB *DOS LIB
For programs compiled in *BASIC - IBM, MS * C-LAT, MS * COBOL-MS, RMF * dBASE-CLIP * PASCAL - MS, TUR * FORTRAN - MS, RMF
GLENCO ENGINEERING, INC
3920 Ridge Ave.
Arlington Hts , IL 60004
***(312) 392-2492***

### HARD DISK DIRECT ACCESS™ 4.0

The Ultimate Hard Oisk Menu System Organizes your software programs into a "user defined" menu system Features single key stroke access time usage tracking custom applications, plus much more Order toll free today 30 day money back guarantee MC/Visa Welcome $89.95 + Shipping To order 1-800-242-MENU

DELTA TECHNOLOGY

DELTA TECHNOLOGY INTERNATIONAL INC
PO Box 1104
Eau Clair, WI 54702
For More Info 715-832-0958

## WORD PROCESSING

### PC-WRITE SHAREWARE VER. 2.7

Fast, powerful word processor/text editor for IBM/PC/XT/AT. Spelling checker, screen clip, mailmerge, split screen, ASCII files, macros Supports proportional printing, laserJet +, and over 300 printers $16 for all software, tutorial/guide on diskette OK to copy Register for manual/support $89 Full 90-day guarantee
Quicksoft
219 First N #224C
Seattle, WA 98109
(206) 282-0452 Visa/MC

### World's Bilingual Word

Duang,Jan, billing word processor for English and one of these Armenian, Euro/Latin, Greek, Hindi, Khmer, Lao, Punjabi, Russian, Tamil, Thai, Viet , or create your own language with font editor For IBM compatibles with graphics & dot matrix printer $59 + $4 s/h in US and Can (Foreign $10 s/h)
MEGACHOMP COMPANY
3524 Cottman Ave
Philadelphia, PA 19149-1606, U S.A
215-331-274B/8138

### MY WORD!™ 2.0: JUST $59!

Full-featured, fully-supported, WS-like word processor. Mail-merge, undelete, sort, math, macros. logical ops, calculation, numeric/alpha format with print, microjustify, table of contents generation, proportional print, spelling checker w/55,000 + words, supports ALL printers 200 + page high-quality manual with quick reference card 30-day money-back unconditional guarantee—NO RISK DOS 2.1-3.2, 256K, two drives Source code? Add $59
T.N.T. SOFTWARE
34069 Hainesville Road
Round Lake, IL 60073
(312) 223-8595

## WORD PROCESSING

### GRAFEAS

**THE WORD PROCESSOR FOR GLOBAL COMMUNICATION**

Simultaneously edit multiple languages on one line *English, Greek, French, German, Spanish, Hebrew,* Italian, *Russian, Arabic Scientific & Graphics* Ideal for legal offices, embassies, multinational business, scientists & engineers Offers mailmerge, document comparison, math formulas, camera ready typesetting etc Only $399

*Apollon Engineering,Inc.*
P O Box 807
Columbia, MD 21044
(1–800) 822–3327, (301) 596–0146
CIRCLE 184 ON READER SERVICE CARD

### PC EDITOR'S CHOICE!

Writers, lawyers, researchers organize free form text by subjects—easily!—with SQUARENOTE™ Make any number of notes, up to 10 pages & 100 subjects each, select by subjects, browse them on the screen, send them to your printer or word processor Import text, too! Many handy features Online help, tutorial & full manual Not copy protected $69 + $5 s/h Check/VISA/MC Full-featured demo $6, credited toward purchase.

SQUARENOTE™

The Idea Librarian

UNION SQUAREWARE
265 Washington St /PO Box 228
Somerville, MA 02143
(617) 623-3023/800-334-0854 Ext 583

### INDEX YOUR TEXT FILE

Need an index for the back of a report, book, manual, or thesis? PROINDEX takes any word processed document and reference creates an index Selectable page/line references ease sensitivity interactive/batch handles ASCII, WordStar & 8 bit data $89 95 includes disk manual & shipping VISA/MC.
Elfring Consulting, Inc
4N899 West Mary Drive
St Charles, Illinois 60174
312-377-3520

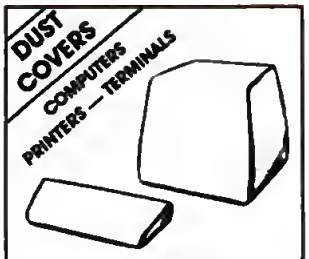
### TRANSFER SCREENS 1.0, $29.95

With Transfer Screens 1 0, you can transfer text or graphics screens between programs Transfer spreadsheet screen to word processor or include a picture from a graphics screen in a text document Keyboard macros, printer support and much more Requires DOS. Introductory price of $29 95 + $3 00 s/h, CA + 6 5% ST Check/MO orders are shipped by certified mail. COD orders add $0 50
LIBRA COMPUTING SYSTEMS, Inc.
105 Serra Way, Suite 443
Milpitas, CA 95035
(408) 946-6296

### CompareRite™ FOR $129.95

SAVE HOURS See every change at a glance! CompareRite compares two documents, instantly highlighting the differences between them in a third draft. Great for contracts, proposals, articles, reports, source code . You select appearance of added and deleted text For major Word Processors Patent pending Introductory price of $129 95+S/H
JURISoft Inc
763 Massachusetts Ave
Cambridge, Ma 02138
800-262-5656/ext 9

## MISCELLANEOUS ACCESSORIES




- 100% Cotton Canvas
- Static-Free/Breathable
- Beige with Grey Trim
- Embroidered Emblem

For: IBM, PC, PC-AT, Compaq, AT&T Leading Edge "D," Epson Equity
Printers: OKIDATA, EPSON, IBM, NEC.

**Contemporary ComputerWear**
1320-36th Avenue
San Francisco, CA 94122
**(800) 826-5761**
Dealers Please Inquire CA (415) 759-1466
CIRCLE 579 ON READER SERVICE CARD

CIRCLE 564 ON READER SERVICE CARD

## ACCESSORIES

### CompuTogs Dust Covers

The ultimate in dust protection. Available in natural canvas/brown trim or new designer gray/black trim (add $2/cover). Our covers are far superior to vinyl!

**COMPARE OUR PRICES!**

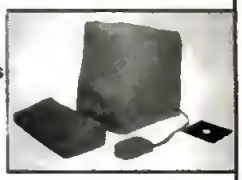
| | | | | | |
|---|---|---|---|---|---|
| Apple 2e MON/CPU/KBD | 24 95 | Tandy 1200 MON/CPU | 24 95 | IBM PC Monitor | 15 95 |
| Apple 2c MON/CPU/KBD | 19 95 | Tandy 1000/1200KBD | 13 95 | 80 COL Printer (specify) | 15 95 |
| McIntoshCPU/KBD/Mouse | 28 95 | IBM PC MON/CPU | 24 95 | 132 COL Printer(specify) | 17 95 |
| Tandy 1000 MON/CPU | 24 95 | IBM PC Keyboard | 13 95 | ATT6300 MonoMON/CPU | 22 95 |

—OVER 200 OTHER MODELS AVAILABLE—to place an order call or write

**CompuTogs** P O Box 2493 Naperville IL 60566 **(312) 961-2958**
VISA/MC Accepted Include $2 00 Shipping CUSTOM EMBROIDERY SHOWN AVAILABLE
CIRCLE 160 ON READER SERVICE CARD

### FABRIC DUST COVERS

Elegant — Affordable — Durable



Our 5th Year
Protecting Computers and Peripherals
Best Quality - American Made, Buy with Confidance!
Best Selection - Six Colors, Covers to Fit Over 1800 Makes & Models.
Best Service - Toll FREE, MC/Visa; FAST
Best Value - Lowest Prices and We Pay Shipping. FREE Valuable Bonus with Purchase
Best Choice - Expertly piped in contrasting color Monogram, Screening and Custom work available.

PLUS OUR EXCLUSIVE BONUS GRAB BAG
Choose a Valuable FREE GIFT when you Buy!
CALL OR WRITE TODAY
**COVERS UNLIMITED**
P.O. BOX 381076
GERMANTOWN, TN 38183-1076
Order TOLL FREE (800) 821-7709 (901) 754-4468
CIRCLE 226 ON READER SERVICE CARD

## BAR CODING

### BARCODE LABEL PRINTING

PrintBar II is a unique and powerful memory resident program that prints code 35, 2 of 5 and UPC barcodes on Epson, IBM graphics and LaserJet printers print directly from any program including dBASE III, clipper, Lotus, Wordstar, without copying data to special print files Superb documentation $295 PC compatible bar code readers $395

**PrintBar II**
BAR CODE PRINTING SOFTWARE

BEAR ROCK SOFTWARE CO.
6069 Enterprise Drive
Placerville, CA 95667
(916) 622-4640

### BAR CODE—LABEL PRINTING

THE LABEL MAKER™ prints bar codes, OCR-A like and large characters from data entered at keyboard or from disk files Create and save unique printing formats and record layouts Performs record add, change, delete, sort and select on disk files A.I. LABELMAKER™ prints AIAG shipping/parts identification labels required by Auto Mfrs Requires IBM PC or work-alike
TJ SOFTWARE INC
PO Box 2044
Arlington Heights, IL 60006
(312) 364-1065

### $7 WHY PAY MORE $55

Bar Code Printing Software for PC, XT, AT & Comp w/printers w/Epson-IBM graphics emulation Universal Bar Code Generator $45 (Works with almost any program). Test disk $7. Small labels $15 Large labels, Logmars, AIAG, dBASE, & subr for Basic, Compilers, WP, Data Mgmt., etc $25-$55. Various codes & densities Bar Code Readers from $295.
GORDON COMPANY
20210 Laceyland
Katy, Texas 77449
713-578-5522

### The BEST BAR CODE READER for the IBM PC & AT

Simple & quick installation
No additional software or port
Metal wand & case

**Also available:**
Bar code printing software
Magnetic stripe readers
Units for other computers & terminals

**TPS ELECTRONICS**
**4047 Transport Street**
**Palo Alto, CA 94303**
Telephone: 415-856-6833
Telex: (Graphnet) 371-9097 TPS PLA
CIRCLE 414 ON READER SERVICE CARD

## BAR CODING

**PRINT YOUR OWN BAR CODES**
WRITEBAR™ prints Codabar, UPC, Code 39, ABC and Interleaved II of V bar codes on most printers. Offers sequential numbers, disk or keyboard operation. Fully configurable installation. Separate OBJ modules available for most languages. $150. Custom programs and bar code readers also avail. MS-DOS and ZENIX.
WILSOFT, INC
PO Box 22132
Tampa, FL 33622
(813) 985-9920

**BAR CODES MADE EASY**

**PERCON® E-Z-READER™**
FAST • ACCURATE • RUGGED

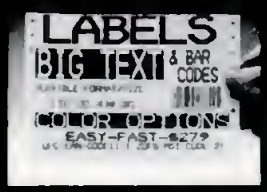
NO SOFTWARE CHANGES with PC/XT/AT, AT&T 6300/7300, TeleVideo 905/955, Kimtron KT7/PC Link, PCTerm, TeleVideo PCS1 & DEC VT220 keyboards. Multi-user RS 232 interfaces.

- Immediate shipment
- Free phone support
- 2-year warranty
- Bar code printing software available

Details or Questions? Call us.
**(503) 344-1189**
2190 W. 11th Ave., Eugene, OR 97402
A LEADER IN BAR CODE READER ENGINEERING

**PERCON®**
CIRCLE 303 ON READER SERVICE CARD

**Print on your PC**




**& Epson/Okidata/IBM Printer**

- Labels for shipping, bins, shelves & inventory
- Text readable up to 50 ft.
- 13 text sizes up to 1.2"x1"
- 10 Bar Codes; 11, UPC/EAN, 12 of 5, MSI, Code 39
- DOD LOGMARS • AIAG
- Flexible Label Size/Design
- Color options • File input
- Menu driven or user program controlled
- EASY • FAST • $49-$279
- 30 Day $ Back Guarantee

**Bar Code Readers for**
Multi user (RS-232)..... $399
PC/XT/AT (Kybd. Attach.)... $385
(No Slot Required)

**WORTHINGTON DATA SOLUTIONS**
130 Crespi Court,
Santa Cruz, California 95060
**408/458-9938**
CIRCLE 404 ON READER SERVICE CARD

**PC Magazine Classified Marketplace the ultimate target market!**

The brand specifiers who read PC Magazine don't have the time to shop around, their only concern is getting what they need as quickly as possible.

**They'll DIRECT their attention to PC Magazine Classified Marketplace**

For them, PC Magazine Classified Marketplace's Direct-Response/Display Ad format represents a fast, easy and cost effective method of product acquisition. They know it will have the products they need and the information they want regarding price, volume discounts, specifications and delivery.

If you think that your business can benefit from the 375,000 brand specifiers who read PC Magazine . . . YOU'RE RIGHT!

**So take DIRECT action and call (212) 503-5115**

## BUSINESS OPPORTUNITIES

**EARN EXTRA $$$$ AT HOME**
Receive needed exposure to earn extra income by listing your experience, goals and equipment. Our database provides low cost/risk approach to introduce home programmers and companies needing programming help. Send now for complete info package and application. Only cost is a low, one-time application fee.
HOME PROGRAMMERS, INC.
PO Box 243-N16
El Segundo, CA 90245-0243

## CATALOGUES

**PCjr Expansion Products**

Possibly the largest selection of PCjr products in the country. We don't just sell PCjr products, we design them.

- Speed Up Products
- Pseudo DMA Cartridges
- Second Floppy Disk Drives
- 3½ Disk Drives
- PCjr Optical Mice
- Monitor Adapters for PC's
- Parallel Printer Ports
- Full Size Keyboards
- Speech Attachments
- Joysticks, Cables, & Adaptors

Call or write to receive our free 32-page catalog of PCjr Add-On products. For even faster results, circle our reader service number.

**PC Enterprises**
*"The jrProducts Group"*
Box 292, Belmar, NJ 07719
(201) 280-0025 (800) 922-PCJR
CIRCLE 376 ON READER SERVICE CARD

## COMPUTER INSURANCE

**DATA SECURITY INSURANCE**
The "all risk" Personal Computer Policy from DSI includes essential coverages not available with other policies: protection against loss of data (even from accidental erasure), loss of custom programs, and fraud. Especially intended for business computers. Coverage can be bound by telephone, 9 to 4 Mountain Time.
DATA SECURITY INSURANCE
4800 Riverbend Road, PO Box 9003
Boulder, CO 80301
(303) 442-0900, (800) 822-0901

**SAFEWARE**
Insure your computer. Safeware provides full replacement of hardware, media, and purchased software. As little as $39 a year provides comprehensive coverage. With our blanket coverage, no lists of equipment are needed. One phone call does it all! Call 8am to 8pm EST (Sat 9 to 5).
SAFEWARE, THE INSURANCE AGENCY INC.
2929 N. High Street, PO Box 02211
Columbus, OH 43202
(614) 262-0559 (OH), (800) 848-3469 (NAT)

## COMPUTER SERVICES

**FLAT RATE REPAIR PRICING**

| | |
|---|---|
| IBM PC/XT/AT system board | $65/$70/$135 |
| IBM PC/XT Keyboards | $45 |
| Hercules adapter boards | $45 |
| AST multifunction boards | $45 |
| IBM diskette drive adapter | $35 |
| Compaq Portable power supply | $75 |

3-5 Days turn around. Call for complete list.
PC Repair Inc
678 East Broadway
Haverhill, Ma 01830
617-372-6545

## DATA CONVERSION

**ON WORD**
Can read any document to disk
Fast, accurate optical scanning
- 10,000 + type fonts
- typeset or typewritten
- font size—6 pts to 28 pts
- to all word processors
- volume discounts
- systems and services
- call for prices

ON WORD DEVELOPMENT
2434 Main St
Santa Monica, CA 90405
(213) 399-7733

**DISK CONVERSION**
We are the oldest and most versatile conversion company in the country. We'll electronically convert disks, tapes, or mag cards to your PC or word processor. Over 20 billion characters converted since 1979. Optical scanning available. We provide the excellence you expect. Text accuracy guaranteed for disk conversions.
TEXT SCIENCES CORPORATION
5430 San Fernando Rd
Glendale, CA 91203
(818) 247-0792

**25¢ PER PAGE OCR TO DISK**
*OCR Text Scanning to disk in Wordstar, Multimate, DisplayWrite, Word Perfect, ASCII + more
*Scan Typset books, manuals, publications, 6-24 point including roman and italic
*Disk/Tape Conversions (bi-directional from PC, WP, 9 track tape, MACINTOSH, (CP/M-DOS)
*Quick Turnaround plus 30-Day Guarantee
1st RUN COMPUTER SERVICES
59 Acorn Ponds Drive
North Hills, NY 11576
212-432-5252/516-627-1493

THE SHOWCASE FOR PRODUCTS AND SERVICES IN THE MS DOS MARKET . . .

**Software Data Conversion**

*continued on the following page*

CLASSIFIED

## DATA CONVERSION

**AMERICA'S MOST ADVANCED DATA CONVERSION FACILITY**

1000 formats tape disk wordprocessors mailing lists optical scanning and custom reformatting

**Data Conversion Laboratory**

65-55 Fresh Meadow La Fresh Meadows NY 11365

**(718) 886-8600**

CIRCLE 565 ON READER SERVICE CARD

## DIGITIZERS

*IMAGE ACE II*

**Video Capture System**

- Digitize video from cameras, tuners, and VCRs directly to your IBM PC display
- 320 x 200 x 4 levels
- 1 3 sec full screen capture
- Complete with hardware card, software, cable, and manual

**Lodge Electronics**

P O. Box 338 • Streamwood, IL 80103

(312) 837-6553

CIRCLE 346 ON READER SERVICE CARD

## DISK CONVERSION

**DISK/DISK DR TAPE/DISK**

Conversions - Automatically Bought a new computer? Convert your data in just 1-2 days. SAVE TIME-SAVE MONEY! DISK/DISK or TAPE/DISK Conversions start as low as $14 for IBM, CP/M, MS-DOS, UNIXV, XENIX & most other systems (Apple, Macintosh, Commodore conversions start at $25) Call or write to:
CREATIVE DATA SERVICES
121D W Latimer Ave
Campbell, CA 95008
408-866-6080

**DATA & MEDIA SPECIALISTS**

Providing conversion/transfer services:
- Mainframes/Minis/Micros/IBM PC
- Tapes, Diskettes, Bernoulli, Punch Cards
- Data Reformatting
- Data Entry
- Programming and Data Base Design
- Lotus and Dbase Capability

Management Technology and Data Systems Inc
138 Brighton Ave
Allston, MA 02134
(617) 782-7177

**CHANGING WDRO PROCESSORS?**

Media transfer to or from
IBM/XEROX, DEC, WANG,
LANIER, CPT, CT, MICOM, NBI,
WORDSTAR, WORDPERFECT, DW3,
MULTIMATE, SAMNA, MASII, DCA
TAPE—DISK
Free test conversion.
CONVERSION SPECIALISTS
531 Main St , Suite 835
El Segundo, CA 92045
(213) 545-6551 • (213) 322-6319

**TAPE TO DISK CONVERSIDNS**

Conversion services to or from over 800 computer systems.
—Magtapes
—Micro Computers
—Mini Computers
—Word Processors
—Typesetters
Our conversion capabilities surpass most in the industry
PIVAR COMPUTING SERVICES, INC.
165 Arlington Hgts. Rd #M
Buffalo Grove, IL 60089
(312) 459-6010

**TAPE/DISK/MICRDFICHE LASER PRINTING/COLOR SLIDES**

- Tape to & from IBM Diskettes
- Tape Duplication (800, 1600, 6250 BPI)
- Tape or IBM Diskettes to
- Microfiche (208 11"/14" pages/fiche)
- Laser Printing (32,000 pages/shift)
- Merge/Purge/Sort Large Files
- Color Slides (11000X16000 pixels/frame)

Call Toll Free (800) 422-9622
In Oklahoma (918) 254-9622
Technical Programming Services, Inc
8506 East 61st Street
Tulsa, OK 74133-1301

**PC Magazine Classified Marketplace the ultimate target market!**

The brand specifiers who read PC Magazine don't have the time to shop around, their only concern is getting what they need as quickly as possible.

**They'll DIRECT their attention to PC Magazine Classified Marketplace**

For them PC Magazine Classified Marketplaces Direct Response Display Ad format represents a fast, easy and cost effective method of product acquisition. They know it will have the products they need and the information they want regarding price, volume discounts, specifications and delivery.

If you think that your business can benefit from the 355,000 brand specifiers who read PC Magazine — YOU'RE RIGHT!

**So take DIRECT action and call (212) 503-5115**

## DISKETTE COPY SERVICE

**SOFTWARE DUPLICATION SERVICES**

XEMAG
THE TOTAL SOLUTION

- World's Largest Duplicator
- Highest Quality
- One Day Turnaround on All Orders
- Attractive Cost Savings
- Xidex/Dysan Media
- One-Stop Shopping
- Copy Protections for all Formats
- Professional Engineering Staff
- Local Sales Support
- Division of XIDEX Corp.

*CALL*
*1-800-247-3968*

CIRCLE 267 ON READER SERVICE CARD

**MAXELL BULK DISKS**

5¼" DS/DD **59¢**
3½" DS/DD **1.29**
5¼" DS/HD **1.59**

Price based on quantity of 300 Includes sleeves, labels and tabs.

**800-222-0490**
In NJ 201-462-7628

● 24 Hour Shipment ●

**MEGASoft**

P.O. Box 710, Freehold, NJ 07728
Full service duplication facility

CIRCLE 203 ON READER SERVICE CARD

**TO PLACE YOUR AD IN PC Magazine Classified Marketplace Call (212) 503-5115**

LOW COST!

**DISK CONVERSION**

We can read from and write to virtually any system including typesetters. We can also format disks for many systems. You can upgrade your system without loosing any data from your old system. Please allow five working days for processing. Quantity discounts available.

2244 N.W. 21 Tr. Miami FL 33142

**(305) 633-5241**

**Birmy Graphics**

CIRCLE 321 ON READER SERVICE CARD

**We're the Leader in Software Duplication**

Fortune 500 companies and software publishers choose Echo Data for 24 Hour turn-around, high quality, and competitive prices! All IBM formats are supported. Custom labels, sleeves, full packaging. We have the best state-of-the-art copy protection in the nation! Why even think about anyone else?

ECHO

Echo Data Services, Inc
Lionville, PA 19353
800-533-4188 or
215-363-2400 in PA

## MAILING LISTS

**FREE CATALOG**
Over 2 million names on 75 owner/user lists IBM, Apple, mini sites, resellers, stores VAP's, chains, mail order dealers, educational, Unix, Pascal, Cobol, Lotus, dBase, modem, investor, publications, clubs Call/Write for free catalog. Include phone & type of business
TARGETED MARKETING INC - Irv Brechner
Box 5125 - P
Ridgewood, NJ 07451
(201) 445-7196

**THE SHOWCASE FOR PRODUCTS AND SERVICES IN THE MS DOS MARKET . . .**

## SUPPLIES

**Laser Toner Cartridges**
Factory new toner cartridges for HP LaserJet™, AppleLaserWriter™, QMS, Canon, and Corona laser printers Three Colors.
Black . . . . . $82 95
Brown . . . . . $96 95
Blue . . . . . $134 95
Visa, MC, COD and PO's accepted $2 00S/H
Laser Express™ Inc
461 Lakeview Dr W Mobile, Al 36609
1-205-343-6646
. . . . . 1-800-553-8111 . . . . . .

**DELUXE PC STATIONARY**
Letterheads in continuous forms w/invisible perforated edges plus matching window or regular envelopes in watermarked quality Classic Layed paper Numerous colors of ink & paper available utilizing many standard formats & typestyles or supply your own, all at very low prices & fast delivery
call 800-624-2961 (Tenn 901-756-7010)
For free samples, prices and info., or write
PerFORMS Press, 8456 Lofton
Cordova, TN 38018

CIRCLE 409 ON READER SERVICE CARD

**LASER CARTRIDGE RECHARGE!**
$$$ Save a lot of money $$$ recharging laser printer toner cartridges for Hewlett Packard Laserjets, Canon, Apple Laserwriter, Corona, QMS Recharged cartridges are reconditioned to work like new but last 20% longer. Money back unconditionally guaranteed Send $40 per cartridge + $3 s/h Monthly discounts
LASER SYSTEMS
7 North Main, PO Box 407
Kaysville, UT 84037
(801) 544-3090

## PC MAGAZINE CLASSIFIED MARKETPLACE
### the ultimate target market!

The brand specifiers who read PC Magazine don't have the time to shop around, their only concern is getting what they need as quickly as possible.

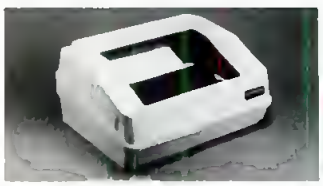
**They'll DIRECT their attention to PC Magazine Classified Marketplace**

For them PC Magazine Classified Marketplace's Direct-Response/Display Ad format represents a fast, easy and cost effective method of product acquisition. They know it will have the products they need and the information they want regarding price, volume discounts, specifications and delivery.

If you think that your business can benefit from the 375,000 brand specifiers who read PC Magazine . . . YOU'RE RIGHT!

**So take DIRECT action and call (212) 503-5115**

## For Your Home or Office!!



### Acoustical Enclosure
- 85% reduction of printer noise
- Designed for 80 column printers
- Stylish, lightweight enclosure with plexiglas® window
- Shipped UPS fully assembled
- Free shipping in the U.S. **$119.00**

### Printer Stand
- Convenient, space saving paper storage
- Slotted for bottom feed
- Attractive smoked plexiglas®
- Free shipping in the U.S.

15" for 80 column width **$29.00**
24" for 132 column width **$39.00**

Toll free 1-800-824-7888, Operator #580
24 hours or Call (617) 425-2311
**Thermo-Fab Corporation**
**Walker Road, Shirley, MA 01464**

**TO PLACE YOUR AD IN PC Magazine Classified Marketplace Call (212) 503-5115**

CLASSIFIED

# FLASH

5.0 NEW!

## SPEED UP YOUR COMPUTER!

NOT COPY PROTECTED

## SAVE & LOAD 123 FILES IN 1/2 THE TIME.

Increase the speed of your programs by as much as 2-5 times. ***FLASH*** will make programs that go to disk operate faster! ***FLASH*** will make word processors, accounting programs, database programs, & spreadsheets operate at top speeds! ***FLASH*** is the fastest & most versatile program of its kind. At right is a list of comparison of ***FLASH*** to Lightning features.

| FEATURES | F | L |
|---|---|---|
| Speeds up disk access | + | + |
| Can utilize above board type memory | + | + |
| Can utilize AT EXTENDED memory | + | |
| Can utilize up to 3 Megabytes of RAM | + | |
| Can buffer up to 26 device drivers | + | |
| Optional Track Read & Write (Speeds 123) | + | |
| Glue files into buffer | + | |
| No learning curve everytime system boots | + | |
| Over 30 commands | + | |
| Less than $70 | + | |
| Printer Spooler Interface | + | |
| RAM DISK Interface | + | |

**FLASH matches or out performs LIGHTNING GUARANTEED!**

## FREE OFFER:

### FLASH RAM-DISK & FLASH KEYS

When you buy ***FLASH*** you get our new products ***FLASH RAM-DISK*** & ***FLASH KEYS*** free ***FLASH RAM-DISK*** uses memory only when needed and frees up the memory when the RAM-DISK files are deleted. ***FLASH KEYS*** speeds up your cursor for scrolling & editing. These programs normally sell for $29.95 each.

***Reg. price*** ..... ~~$89.95~~
***Limited time*** ..... **$69.95**

## BACK-TO-DOS $49.95 NEW!

Back-To-Dos allows you to interrupt the program you are working on, go to DOS, do ANY DOS command or run ANY other program regardless of size, then return back to your original program exactly where you left off screen and all!

- Imagine DOS at your finger tips
- Imagine ONLY 15K of RAM needed for this
- Imagine —Being in word processing
  —Going to DOS
  —Formatting a disk
  —Going back to word processing
  —Saving your file
- Imagine —Being in a spreadsheet
  —Going to DOS
  —Running your database program
  —Returning back to spreadsheet
- Works when screen in graphics mode too

ORDER!

## SPOOL-MASTER 5.0 $49.95 NEW!

### SPEED UP YOUR PRINTER

- No more waiting for your printer
- Automatically allocates RAM when printing
- Automatically frees up RAM when done printing
- True RAM spooler
- Allows multiple copies
- Status shows how many pages left and how much time left printing
- Handles single sheet forms
- Can be un-installed at ANY time
- Finally a RAM spooler that doesn't use ANY RAM when it is not printing
- Many keyboard commands to control spooler

* **When used in conjunction with FLASH**

ORDER!

## SUPER-ED 3.15 $49.95 NEW!

### THE ULTIMATE DBASE PROGRAM EDITOR

- Edit Dbase program files with wordstar like commands
- Configurable keystroke commands
- Edit 2 files at once & copy blocks between them
- Extensive search & replace options
- Execute any DDS command from within the editor
- Keyboard macros
- Print parts of a file
- Super Fast Full screen editing
- Shows Num-lock & Key-caps status
- Go to specific line number
- Merge 2 files together

ORDER!

## *SPECIAL PACKAGE OFFER: $150.00*

**Gives you over $280.00 worth of software!**

- **FLASH**
- **FLASH RAM-DISK**
- **BACK-TO-DOS**
- **SUPER-ED 3.15**
- **FLASH KEYS**
- **SPDDL-MASTER 5.0**

**ORDER LINE: 1-800 25-FLASH / INFO LINE: 1-317 253-8088**

Add $4.00 shipping & handling (Overseas add $15.00)
Software Master 6352 Guilford Avenue Indianapolis, IN 46220

SOFTWARE MASTERS®

Lightning is a trademark of PCSG  Word Star is a trademark of Micro Pro intl  123 is a trademark of Lotus

CIRCLE 488 ON READER SERVICE CARD



# Subscribe to PC Magazine and save 62%

You'll receive in-depth and comprehensive product evaluations and comparative hardware and software evaluations from PC Labs, the publishing industry's *only* testing laboratory.

You'll receive new applications, power tips and special reports designed to add more power and flexibility to your IBM/MS DOS-standard system.

And you'll network with other users and discover routines and techniques that can save you time and money.

Subscribe to *PC Magazine* today! Send the coupon to: *PC Magazine* · P.O. Box 2443 · Boulder, Colorado 80322 *or call Toll-Free; 1-800-852-5200 now!*

4Z098

**Yes,** send me PC Magazine for:

☐ 22 issues (one year) for $27.97. Save 57%!

☐ 44 issues for only $49.97. Save 62%!

Savings based on annual single-copy price of $64.90.

MR./MRS./MS. PLEASE PRINT FULL NAME

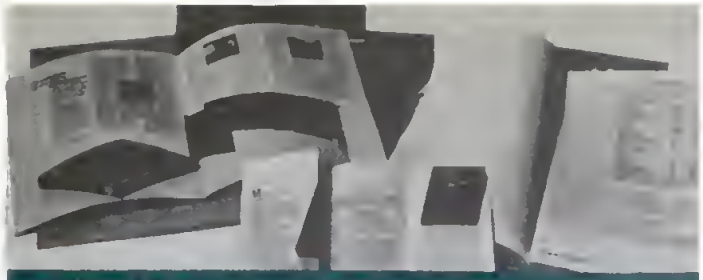
COMPANY

ADDRESS

CITY

STATE ZIP

Add $22 per year for postage outside USA, US currency only. Please allow up to 60 days for delivery of first issue. Basic annual subscription price is $34.97.



# FREE INFORMATION

## About Products & Services In this Issue!

Here's your chance to have all the facts, figures, and specifications about the products or services advertised or mentioned in this issue of PC Magazine. Absolutely free of charge!

Just complete the attached card. We'll notify the manufacturers or distributors so you can receive your free brochures directly from them.

## READER SERVICE CARD

**It's as easy as 1, 2, 3 to have valuable information about dozens of products right at your fingertips:**

**1** Fill in your name and address and check off your answers to the three research questions. (One card per person, please.)

**2** Circle the numbers on the card that correspond to the ads or articles you'd like more information about. (Numbers for advertised products are repeated in the Advertiser Index as well.)

**3** Mail the card today...it's postage paid. The literature will be mailed free of charge to your attention.

**1) For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (check all that apply)**

***Hardware***
- e ☐ Mainframe
- b ☐ Mini
- c. ☐ PC
- d ☐ Printers/Plotters
- e ☐ Monitors
- f. ☐ Terminals
- g ☐ Modems
- h ☐ Hard Disk/Tape Back-up
- i ☐ Add-in Boards
- j. ☐ LANS
- k. ☐ Micro-Mainframe Links

***Software***
- l ☐ Communications
- m ☐ Accounting
- n ☐ Spreadsheets/Financial Planners
- o ☐ Project Managers
- p ☐ Word Processors
- q ☐ Database Managers
- r ☐ Graphics

**2) Your primary job function is (check)**
- s ☐ Administrative/General Management
- t ☐ MIS/DP, Communications Systems, Programming
- u ☐ Engineering/R&D
- v ☐ Finance/Accounting
- w ☐ Marketing/Sales

**3) Next step after information is received:**
- x ☐ Purchase Order
- y ☐ Evaluation
- z ☐ Specification/Recommendation

PLEASE PRINT CLEARLY—use only one card per person

Name _____ Bus. Phone ( ) _____

Company _____ Title _____

Address _____ Apt _____

City _____ State _____ Zip _____
(Zip code must be included to insure delivery)

☐ **Please send me one year (22 issues) of *PC Magazine* for $27.97 and bill me. (Full one-year subscription price $34.97.) Offer valid in U.S. and possessions only.**

**CIRCLE FOR FREE INFORMATION** **Void after August 15, 1987**

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 |
| 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 |
| 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 |
| 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 |
| 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 |
| 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 |
| 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 |
| 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 |
| 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 |
| 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 |
| 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 316 | 316 | 317 | 318 | 319 | 320 |
| 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 336 | 339 | 340 |
| 341 | 342 | 343 | 344 | 345 | 346 | 347 | 346 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 |
| 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 376 | 376 | 377 | 376 | 379 | 360 |
| 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 |
| 401 | 402 | 403 | 404 | 405 | 406 | 407 | 406 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 416 | 419 | 420 |
| 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 |
| 441 | 442 | 443 | 444 | 446 | 446 | 447 | 446 | 449 | 450 | 451 | 452 | 453 | 464 | 455 | 456 | 467 | 458 | 459 | 460 |
| 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 476 | 476 | 477 | 476 | 479 | 460 |
| 481 | 462 | 483 | 464 | 485 | 486 | 487 | 468 | 489 | 490 | 491 | 492 | 493 | 494 | 496 | 496 | 497 | 498 | 499 | 500 |
| 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 516 | 516 | 517 | 516 | 519 | 520 |
| 521 | 522 | 523 | 524 | 526 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 |
| 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 649 | 550 | 551 | 552 | 563 | 564 | 555 | 556 | 557 | 558 | 559 | 560 |
| 681 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 672 | 573 | 574 | 575 | 576 | 577 | 576 | 579 | 560 |
| 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 691 | 592 | 593 | 594 | 595 | 596 | 597 | 596 | 599 | 600 |
| 601 | 602 | 603 | 604 | 605 | 606 | 607 | 606 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 516 | 619 | 520 |
| 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 |
| 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 656 | 659 | 660 |
| 861 | 662 | 663 | 654 | 665 | 668 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 676 | 676 | 677 | 676 | 679 | 680 |
| 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 696 | 699 | 700 |

PC5/12-2

**1) For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (check all that apply)**

***Hardware***
- a ☐ Mainframe
- b ☐ Mini
- c ☐ PC
- d ☐ Printers/Plotters
- e ☐ Monitors
- f ☐ Terminals
- g ☐ Modems
- h ☐ Hard Disk/Tape Back-up
- i ☐ Add-in Boards
- j ☐ LANS
- k ☐ Micro-Mainframe Links

***Software***
- l ☐ Communications
- m ☐ Accounting
- n ☐ Spreadsheets/Financial Planners
- o ☐ Project Managers
- p ☐ Word Processors
- q ☐ Database Managers
- r ☐ Graphics

**2) Your primary job function is (check)**
- s ☐ Administrative/General Management
- t ☐ MIS/DP, Communications Systems, Programming
- u ☐ Engineering/R&D
- v ☐ Finance/Accounting
- w ☐ Marketing/Sales

**3) Next step after information is received:**
- x ☐ Purchase Order
- y ☐ Evaluation
- z ☐ Specification/Recommendation

PLEASE PRINT CLEARLY—use only one card per person

Name _____ Bus. Phone ( ) _____

Company _____ Title _____

Address _____ Apt _____

City _____ State _____ Zip _____
(Zip code must be included to insure delivery)

☐ **Please send me one year (22 issues) of *PC Magazine* for $27.97 and bill me. (Full one-year subscription price $34.97.) Offer valid in U.S. and possessions only.**

**CIRCLE FOR FREE INFORMATION** **Void after August 15, 1987**

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 101 | 102 | 103 | 104 | 105 | 106 | 107 | 106 | 109 | 110 | 111 | 112 | 113 | 114 | 116 | 116 | 117 | 116 | 119 | 120 |
| 121 | 122 | 123 | 124 | 125 | 126 | 127 | 126 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 136 | 139 | 140 |
| 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 164 | 155 | 156 | 157 | 156 | 159 | 160 |
| 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 176 | 179 | 160 |
| 181 | 182 | 183 | 164 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 196 | 196 | 197 | 196 | 199 | 200 |
| 201 | 202 | 203 | 204 | 205 | 206 | 207 | 206 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 216 | 219 | 220 |
| 221 | 222 | 223 | 224 | 225 | 226 | 227 | 226 | 229 | 230 | 231 | 232 | 233 | 234 | 236 | 236 | 237 | 236 | 239 | 240 |
| 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 260 | 251 | 262 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 |
| 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 276 | 279 | 260 |
| 281 | 282 | 283 | 284 | 265 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 295 | 297 | 298 | 299 | 300 |
| 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 314 | 314 | 316 | 316 | 317 | 316 | 316 | 320 |
| 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 336 | 339 | 340 |
| 341 | 342 | 343 | 344 | 345 | 346 | 347 | 346 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 356 | 359 | 360 |
| 351 | 362 | 363 | 364 | 365 | 365 | 367 | 366 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 376 | 379 | 380 |
| 381 | 362 | 383 | 364 | 385 | 386 | 367 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 |
| 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 416 | 419 | 420 |
| 421 | 422 | 423 | 424 | 425 | 426 | 427 | 426 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 436 | 439 | 440 |
| 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 464 | 455 | 456 | 457 | 458 | 459 | 460 |
| 481 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 476 | 479 | 450 |
| 481 | 482 | 483 | 464 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 496 | 496 | 497 | 496 | 499 | 500 |
| 501 | 502 | 503 | 504 | 505 | 506 | 507 | 506 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 516 | 519 | 520 |
| 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 536 | 539 | 540 |
| 541 | 542 | 543 | 544 | 545 | 546 | 647 | 548 | 549 | 550 | 551 | 552 | 563 | 554 | 555 | 556 | 557 | 688 | 559 | 560 |
| 561 | 562 | 563 | 684 | 565 | 566 | 567 | 586 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 576 | 579 | 560 |
| 581 | 582 | 583 | 564 | 585 | 586 | 587 | 586 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 |
| 501 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 616 | 619 | 620 |
| 621 | 622 | 623 | 624 | 625 | 626 | 627 | 626 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 |
| 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 |
| 661 | 682 | 663 | 664 | 665 | 666 | 667 | 688 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 676 | 679 | 680 |
| 681 | 682 | 663 | 684 | 685 | 686 | 687 | 688 | 669 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 696 | 699 | 700 |

PC5/12-1

## HOW TO STAY ON TOP OF WHAT'S WHAT IN THE PC MARKET

Are you frequently called upon to give advice about PC products? Is it your responsibility to make PC hardware, software and peripherals selections?

If so, there are probably products or services in this issue you wish you knew a little more about.

Well, all you have to do is send in your PC Magazine reader service card. You just circle the number that corresponds to the ad or article that interested you. We'll forward your name to the manufacturers or distributors so they can send you the literature you need.

Don't waste a minute. The sooner you fill out your card and send it in, the sooner you can start building your product reference file!

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 27346 PHILADELPHIA, PA

Postage will be paid by addressee

PC MAGAZINE
P.O. Box 40338
Philadelphia, PA 19106-9931

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 27346 PHILADELPHIA, PA

Postage will be paid by addressee

PC MAGAZINE
P.O. Box 40338
Philadelphia, PA 19106-9931

# INDEX TO ADVERTISERS


| RS # | ADVERTISERS | PAGE |
|---|---|---|
| * | 3-CDM | 259 |
| 238 | 3-CDM | 260-261 |
| 357 | AdvancedWare | 364 |
| 242 | Alps America | 316-317 |
| 507 | American Micro Tech | 304 |
| 327 | American Research Corp | 236 |
| 475 | American Small Business | 77 |
| 179 | American Software House | 359 |
| 174 | Analytx International Inc | 401 |
| * | Arlington Computer Products | 420-421 |
| 208 | Ashton-Tate | 56-57 |
| * | AST Research | 2-3 |
| 540 | ATI Technologies Inc. | 319 |
| 164 | Autodesk, Inc | 37 |
| 367 | Banner Blue | 387 |
| 152 | Barrington Systems | 64 |
| * | Bay Express | 422 |
| 359 | Bentley Computers | 80-81 |
| 341 | Bible Research | 428 |
| 129 | Boeing Computer Services | 381 |
| 138 | Borland International | C2-4,1 |
| 481 | Bulldog Computer Products | 362-363 |
| * | Business Computers of Peterborough | 346-347 |
| 472 | Business Tools, Inc | 95 |
| 312 | Buttonware | 325 |
| 153 | Calcomp | 376 |
| 216 | California Digital | 414 |
| 156 | Central Point Software | 401 |
| 120 | Central Point Software | 86 |
| 130 | Challenge Software | 424 |
| 275 | Champion Business Systems | 391 |
| 270 | Chicago Computer Connection | 419 |
| 348 | CIE Terminals | 271 |
| 232 | Cipher Data Products | 175 |
| * | Compaq Computer Corp | 188-189 |
| 227 | CompuAdd Corp. | 250-253 |
| 226 | Compuserve | 178 |
| 297 | Computer Classified Inc. | 418 |
| 109 | Computer Discount Warehouse | 415 |
| 224 | Computer Inc | 429 |
| 362 | Computer Line | 324 |
| 183 | Computer Mail Order | 382-383 |
| 163 | Computer Products United | 400 |
| 225 | Core International | 111 |
| 340 | Crosstalk Communications | 40-41 |
| * | Curtis Manufacturing | C6 |
| 363 | Custom Real Time Inc. | 354 |
| 215 | CXI | 272 |
| 151 | DAC Software, Inc. | 17 |
| 146 | DataCopy | 397 |
| 140/141 | DataDesk Int'l | 211 |
| 284 | Datavue | 193 |
| 338 | Day-Flo Software | 320 |
| 541 | DCA | 206-207 |
| 285 | Dest Corp. | 70 |
| 331 | Dialog Information Services | 281 |
| 241 | Diconix | 256 |
| 280 | Digital Products | 378 |
| * | Dow Jones News/Retrieval | 247 |
| 295 | Dresselhaus Computer Products | 386 |
| 330 | Dynamic Microprocessor Assoc | 28 |
| 173 | EKD | 322 |
| 318 | Electnc Software | 195 |
| * | Everex Systems | 29 |
| 194 | Everex Systems | 30-31 |
| 287 | Fifth Generation | 292-293 |
| 148 | Fastcom | 374 |
| 180 | Flagstaff Engineering | 426 |
| 316 | Ford Software | 356 |
| 386 | Foresight Resources | 340-341 |
| 246 | Fox & Geller | 53 |
| 315 | Funk Software | 139 |
| 311 | Funk Software | 137 |
| 317 | Funk Software | 141 |
| 324 | Gateway Communications | 294 |
| 117 | Gateway Microsystems | 396 |
| 247 | GEISCO | 241 |
| 266 | General Technology | 394 |
| 239 | Genoa Systems | 55 |
| 132 | Glenco Engineering | 428 |
| 264 | Good Software | 279 |
| 375 | Great Lakes | 418 |
| 255 | Great Western Electronics | 427 |
| 260 | H&E Computronics | 464 |
| 276 | Hauppauge Computer Works Inc | 32 |
| 201 | Haventree | 380 |
| 142 | Hercules Computer Technology | 72-73 |
| 143 | Hercules Computer Technology | 395 |
| 494 | IDE Associates | 122 |
| 369 | Information & Technology Systems | 370 |
| 128 | INS | 307 |
| 493 | Integrated Marketing Corp. | 321 |
| 511 | Intel | 302-303 |
| 223 | Intel-Pro | 308 |
| 212 | Intelligent Microsystems | 384 |
| 269 | International Battery Corp. | 313 |
| 243 | Jade Computer Products | 417 |
| 499 | Jadine Research | 424 |
| 133 | JDR Micro Devices | 411 |
| 491 | J&M Systems | 427 |
| 272 | Kensington Microware | 79 |
| 221 | Kensington Microware | C5 |
| 526 | Lahey Computer Systems | 330 |
| 536 | Laser Digital | 274 |
| 371 | Lattice Inc. | 310 |
| 400 | Logicsoft | 213-218 |
| 182 | Logitech | 299 |
| 263 | Macola | 93 |
| 374 | Macropac | 375 |
| 154 | Math Soft Inc. | 42 |
| * | MICRDBEST | 410 |
| 302 | MicroCom Systems | 21 |
| 388 | Microcom | 201 |
| * | MicroLogic Corp | 311 |
| 502 | Micropro International | 309 |
| 170 | Microport Systems | 66 |
| * | Microrim | 61 |
| * | Microsoft | 145-148 |
| 390 | Microsync | 395 |
| 220 | Micro Systems Developers | 329 |
| * | Microway Inc. | 360 |
| 159 | Microway Inc. | 87 |
| 113 | Micro-Z Company | 399 |
| 384 | Migent Software | 88-89 |
| 383 | Migent Software | 349 |
| 387 | MHI Industnes | 418 |
| 524/525 | Moneysworth Computer Products | 68-69 |
| * | Mouse Systems | 115 |
| 350 | Mouse Systems | 116-117 |
| 506 | Multitech Electronics | 390 |
| 196 | Nantucket Corp. | 127 |
| 234 | Northgate Computer Systems | 412-413 |
| 155 | Novell | 268-269 |
| 492 | Orchid Technology | 289 |
| 304/305/306 | Orchid Technology | 50 |
| 253 | Our Business Machine | 402 |
| * | Paradise Systems | 131 |
| 193 | Paul Mace Software | 426 |
| 150 | PC American | 379 |
| 310 | PC Brand | 22-25 |
| 144 | PC Brand | 60 |
| * | PC Connection | 226-229 |
| 372 | PC Designs | 323 |
| 325 | PC Discount | 76 |
| 483 | PC Engineenng | 202 |
| 496 | PC Mart | 181 |
| 535 | PC Network | 284-287 |
| 145 | PC Software Interest Group | 4 |
| 385 | PC Tech | 429 |
| 539 | PC's Limited | 8-11 |
| 358 | Peachtree Software | 405 |
| 161 | Perma Power Electronics | 315 |
| 365/366 | Persoft | 58 |
| 489 | Personal Computer Support Group | 157-159 |
| 532 | PMI | 314 |
| 379 | Polans Software | 373 |
| 139 | Polygon Assoc. Inc. | 39 |
| 187 | Primavera Systems | 326 |
| 300 | Prosoft | 47 |
| 190 | Quadram | 392 |
| 236 | Qubie | 282 |
| 104 | Q.W. Page | 199 |
| 167 | Racore Computer Products | 407 |
| 107 | The Research Group | 425 |
| 534 | Revolution Software Inc. | 16 |
| 249 | Reynolds & Reynolds | 429 |
| 523 | Rix Softworks | 133 |
| 290 | Rose Electronics | 404 |
| 391 | SABA Tech | 96-97 |
| * | SAS Institute | 262 |
| 470 | SBT | 20 |
| 124 | Sears Business Systems | 71 |
| 520 | Server Technology | 357 |
| 123 | Silicon Specialties | 62 |
| 314 | Simplenet | 94 |
| 101 | Softline | 90 |
| 334 | SoftLogic Solutions | 165 |
| 288 | SoftLogic Solutions | 163 |
| 530 | Software Bottling | 327 |
| 471 | Software Express Direct | 78 |
| 353 | Software Group, The | 368-369 |
| 393 | Software Link, Inc. | 171 |
| 394 | Software Link, Inc. | 63 |
| 488 | Software Masters | 454 |
| * | Software Publishing | 333 |
| 517 | STB Systems | 109 |
| 487 | STSC | 300 |
| 500 | Swiedler Information Systems | 26 |
| 251 | Symantec | 243 |
| 158 | Systems Management Associates | 427 |
| 277 | Talltree Systems | 196 |
| 135 | Tandon Corp. | 345 |
| 299 | Tandy/Radio Shack | 233 |
| 322 | Technoland | 398 |
| 237 | Tecmar | 82 |
| 206 | Telemart | 84-85 |
| 112 | Telenetics | 166 |
| 531 | Telex Computer Products | 249 |
| 103 | Thomson Computer Products | 125 |
| * | Toshiba | 12-13 |
| 185/186 | Touchbase Systems | 121 |
| * | Transec Systems Inc. | 312 |
| 119 | Tseng Labs | 266 |
| 192 | Turner Hall Publishing | 221 |
| 361 | Turner Hall Publishing | 408 |
| 166 | U.S. Robotics Inc. | 153 |
| 233 | Unison World | 74 |
| 308 | United Software Security | 180 |
| 301 | United Software Security | 92 |
| 339 | United Solutions | 342 |
| 218 | Uptime | 19 |
| 121 | Value Plus | 18 |
| 364 | Ven-Tel Inc | 14 |
| 286 | VM Labs | 408 |
| 131 | VM Personal Computing | 173 |
| 171 | Warehouse Data Products | 355 |
| 515 | Wells American | 5 |
| 309 | Whitecrane Systems | 390 |
| 513 | Word Perfect Corp | 49 |
| 518 | XY Quest Inc | 318 |
| 106 | Zuckerboard-ATD | 328 |


*—No Reader Service # Please call advertiser for information

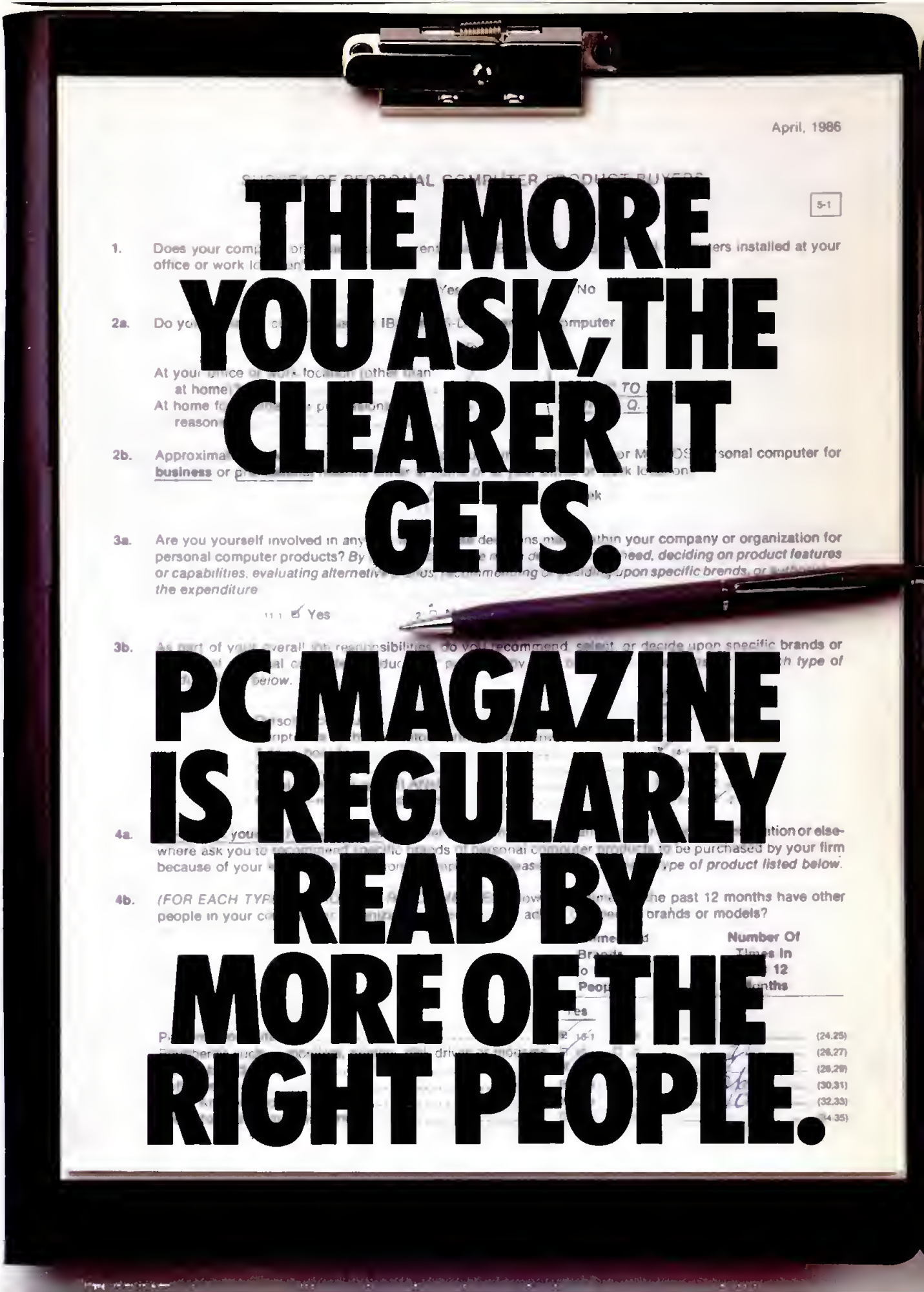

**PC MAGAZINE ADVERTISING SALES STAFF**
Advertising Coordinator . . . Vickie Pinsky
Advertising, Systems Manager . . . Vicki Egan
1 Park Avenue, New York, NY 10016 (212) 503-5100

**Janet Ryan - Eastern Advertising Director**
(212) 503-5100
**MA, NH, VT, ME, RI, CT**
Jonathan Lane - District Manager
The Prudential Center
800 Boylston St , Ste. 1390
Boston, MA 02199
(617)375-4300
John Bucknavage - Account Representative
(212)503-5132
**DE, MD, DC, VA, WV, NC, SC, AL, MS, TN, AR, KY, PA, GA**
Bonnie Breslauer - District Manager
Charisse Smith - District Sales Representative
5901 Peachtree Dunwoody Road—Suite 500
Atlanta, GA 30328
(404)394-0590
Lauren Morse - Account Representative
(212)503-5130

**NY, NJ, PA**
Liz Medley - District Manager
(212) 503-5307
Pat Toohey - District Sales Representative
One Park Avenue
New York, NY 10016
(212) 503-5149
Mary Jo Nelson-Account Representative
(212) 503-5128
**NE, WI, IL, IN, MN, MO, OH, MI, IA, ND, SD, Canada**
Arthur Kossack - District Manager
Jim Stafford - District Sales Representative
180 N Michigan Avenue Suite 1400
Chicago, IL 60601
(312)346-2600
Sloan Seymour - Account Representative
(212)503-5126

**Jeff Miller - Western Advertising Director**
(415) 598-2332
**CA (San Francisco & North), OR, WA, ID**
Heidi Spencer - Distnct Manager
11 Davis Drive
Belmont, CA 94002
(415)598-2341
Adolphus Holden - Account Representative
(212)503-5129
**CA (Santa Barbara to So. San Francisco), ID, MT, AK**
Gini Talmadge - District Manager
11 Davis Drive
Belmont, CA 94002
(415)598-2344
Beth Tunis - Account Representative
(212)503-5127

**CA, (LA, San Diego & Orange County), AZ, NV, HI**
Debra Huisken - District Manager
(213)387-2100
Steve Lincoln - District Sales Representative
3460 Wilshire Blvd.
Los Angeles, CA 90010
(213)387-2100
Ron Kost - Account Representative
(212)503-5100
**TX, OK, LA, KS, UT, NM, CO**
Jennifer Bartel - District Manager
Ken Hom - District Sales Representative
5956 Sherry Lane Suite 1330
Dallas, TX 75225 (214) 691-6934
Joanna Broome - Account Representative
(212)503-5104


April, 1986
5-1
1. Does your comp
office or work lo
Yes
No
2a. Do yo
At your
at home
At home fo
reason
2b. Approxima
business or
3a. Are you yourself involved in any
personal computer products? By
or capabilities, evaluating alternativ
the expenditure
Yes
3b. As part of your overall job responsibilities, do you recommend, select, or decide upon specific brands or
4a. you
where ask you to
because of your
4b. (FOR EACH TYP
people in your co
Number Of
Times In
12
Months
Yes
THE MORE YOU ASK, THE CLEARER IT GETS.
PC MAGAZINE IS REGULARLY READ BY MORE OF THE RIGHT PEOPLE.

The research is coming in and its message is clear:

PC Magazine is being read regularly and trusted by more of the right people. And with a circulation of 375,000—the largest and fastest growing in the field—that's a lot of right people.

In surveys conducted by Market Probe International, Inc., a well-known independent research organization, customers obtained from lists of three hardware and software vendors identified PC Magazine as the publication they read most regularly.

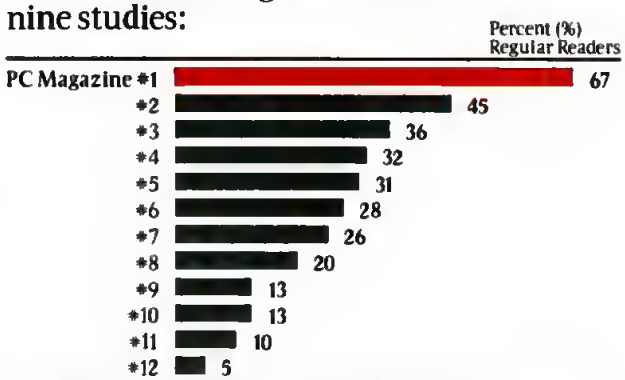
Market Probe was also asked to survey six PC user groups across the country. These groups, founded to provide support and encourage communication among PC users, number many of the country's most influential and knowledgeable purchasers among their members. Once again the results are in and the answer is the same.

In Washington, D.C., Houston, New York City, Silicon Valley, St. Louis and Indiana/Kentucky—user group members ranked PC Magazine as the most regularly read publication.

In all nine studies, when asked to rate the magazines they read regularly, buyers and user group members consistently rated PC Magazine highest for in-depth, objective product reviews based on actual lab tests. They know only too well how difficult it is to make good product choices for their companies and organizations in the fast-moving PC market—and who provides the guidance that makes the difference.

**Regular Readership Scores—Buyer/User Group Studies.**

Here are the averages across the nine studies:




Base: Buyers/User Group Members Who Recommend/Select Brands of Microcomputer Equipment

If you're an advertiser in the PC market, we'd be pleased to show you our full research reports. We also encourage you to survey your own customers. Their answers will point to the same conclusion: PC Magazine. The largest and fastest growing circulation among brand specifiers in the PC/MS-DOS market.

PC MAGAZINE

**THE BIG BOOK BY ANY MEASURE.**

Source: Market Probe International, Inc.
Buyer and User Group Studies, 1986

# PC MAGAZINE ADVERTISERS PRODUCT INDEX

| RS# | ADVERTISER | PRODUCT | PAGE# |
|---|---|---|---|
| **ACCOUNTING SOFTWARE** | | | |
| 472 | Business Tools, Inc | Accounting | 95 |
| 130 | Challenge Software | Accounting Software & Database | 424 |
| 275 | Champion Business Systems | Business Accounting Software | 391 |
| 260 | H & E Computronics | Lotus Software | 464 |
| 263 | Macola Inc | Accounting Software | 93 |
| 104 | D W Page | Accounting Software | 199 |
| 500 | Swiedler Information Systems | The Company Books/Bookkeeper | 26 |
| 358 | Peachtree Software | Complete Business Accounting System | 405 |
| **DATABASE MANAGERS** | | | |
| 208 | Ashton Tate | dBase III | 56-57 |
| 312 | Buttonware | PC File/R | 325 |
| 130 | Challenge Software | Accounting Software & DataBase | 424 |
| 151 | DAC Software | DAC Easy Base | 17 |
| 246 | Fox & Geller | Quickcode | 53 |
| * | Micronm | Rbase | 61 |
| 470 | SBT Corp | dBase Accounting | 20 |
| 251 | Symantec | Database Word Processor | 243 |
| **DECISION SUPPORT SYSTEMS** | | | |
| 338 | Day-Flo Software | Decision Support | 320 |
| **INFORMATION MANAGERS** | | | |
| 330 | Dynamic Microprocessor Assoc | Chairman | 28 |
| **INTEGRATED SOFTWARE** | | | |
| 383 | Migent Software | Ability Plus | 349 |
| 353 | Software Group, The | Enable | 368-369 |
| 251 | Symantec | Database Word Processor | 243 |
| | SAS Institute, Inc | PC SAS System | 262 |
| **LANGUAGES** | | | |
| 152 | Barrington Systems | Clanon | 64 |
| 526 | Lahey Computer Systems | F77L/Lahey Fortran | 330 |
| * | Microsoft | Quick Basic | 145-148 |
| 487 | STSC Inc | Statgraphics | 300 |
| 138 | Borland International | Turbo Pascal, Turbo Database Toolbox, Turbo Gameworks | C2-4, 1 |
| **OPERATING SYSTEMS/ENVIRONMENTS** | | | |
| 170 | Microport Systems | Unix Based Operating System | 66 |
| 394 | Software Link, Inc | PC Mos | 63 |
| 286 | VM Labs | Personal VM | 408 |
| **PROGRAM DEVELOPERS/GENERATORS** | | | |
| 132 | Glenco Engineering | Programming Software | 428 |
| 196 | Nantucket Corp | Clipper | 127 |
| **PROJECT MANAGEMENT** | | | |
| 362 | Computer Line | Plan Trac | 324 |
| 187 | Primavere Systems | Proj. Management Software | 326 |
| * | Software Publishing | Harvard Total Project Manager | 333 |
| **TEXT EDITORS** | | | |
| 138 | Borland International | Turbo Editor, Turbo Editor Toolbox | C2-4,1 |
| **STATISTICAL SOFTWARE** | | | |
| 487 | STSC Inc | Statgraphics | 300 |
| * | SAS Institute, Inc | PC SAS System | 262 |
| **TRAINING SOFTWARE/PUBLISHING** | | | |
| 224 | Computer Inc | Compututor | 429 |
| **UTILITIES** | | | |
| 489 | Personal Computer Support | Breakthru 286, Breakthru Plus 286, Lightning | 157-159 |
| 387 | Banner Blue | Drg | 387 |
| 363 | Custom Real Time Inc | Software Utility | 354 |
| 146 | Data Copy | Microfax | 397 |
| 316 | Ford Software | Diskcal | 356 |
| 311 | Funk Software | Inword | 137 |
| 315 | Funk Software | Noteworthy | 139 |
| 317 | Funk Software | Sideways | 141 |
| * | Micro Logic Corp | Tornado Notes | 311 |
| 220 | Micro Systems Developers | Disk Cache | 329 |
| 113 | Micro-Z Company | Direct Link | 399 |
| 502 | Micropro International | Wordstar | 309 |
| * | Microway | 8087 Performance Upgrade | 360 |
| 159 | Microway | Smasher/ECM | 87 |
| 145 | PC SIG | Public Domain Software | 4 |
| 534 | Revolution Software Inc | Cruise Control | 16 |
| 290 | Rose Electronics | Flashcom | 404 |
| 530 | Software Bottling | Software Tool | 327 |
| * | Transecsystems Inc | Unlock | 312 |
| 301 | United Software Security | On Guard | 92 |
| 138 | Borland International | Turbo Graphics Toolbox | C2-4,1 |
| 309 | White Crane Systems | The Brooklyn Bridge | 390 |
| 334 | Softlogic Solutions | Disk Optimizer | 165 |
| 288 | Softlogic Solutions | Carousel | 163 |
| 488 | Software Masters | Disk Cashe | 454 |
| **WORD PROCESSING SOFTWARE/AIDS** | | | |
| 341 | Bible Research Systems | The Word Processor | 428 |
| 318 | Electric Software Inc | Electric Pencil | 195 |
| 311 | Funk Software | Inword | 137 |
| 317 | Funk Software | Sideways | 141 |
| 264 | Good Software | Celebrity | 279 |
| 502 | Micropro International | Wordstar | 309 |
| 145 | PC SIG | Public Domain Software | 4 |
| 192 | Turner Hall Publishing | 4Word Word Processor | 221 |
| 518 | Xyquest | Xywrite 3.0 | 318 |
| 302 | MicroCom Systems | Public Domain & Multifunction Software | 21 |
| S13 | Wordperfect Corporation | Wordperfect | 49 |

| RS# | ADVERTISER | PRODUCT | PAGE# |
|---|---|---|---|
| **CAD/CAM** | | | |
| 47S | American Small Business Comp | Prodesign II | 77 |
| 164 | Autodesk | Autocad | 37 |
| 154 | Math Soft Inc | Mathcad | 42 |
| **SPREADSHEET/TEMPLATES** | | | |
| 317 | Funk Software | Sideways | 141 |
| 374 | Macropac International | 101 Macros Lotus | 375 |
| 145 | PC SIG | Public Domain Software | 4 |
| 158 | Systems Management Assoc | PC Documate | 427 |
| 361 | Turner Hall Publishing | SQZ | 408 |
| **ARTIFICIAL INTELLIGENCE** | | | |
| 138 | Borland International | Turbo Prolong | C2-4,1 |
| **DESKTOP PUBLISHING** | | | |
| 233 | Unison World | Desktop Publishing | 74 |
| 300 | Prosoft | Fontasy | 47 |
| **DEMONSTRATION SOFTWARE** | | | |
| 218 | Uptime | Uptime | 19 |
| **EDUCATIONAL SOFTWARE** | | | |
| 341 | Bible Research Systems | The Word Processor | 428 |
| 218 | Uptime | Uptime | 19 |
| 302 | MicroCom Systems | Public Domain & Multifunction Software | 21 |
| **ENTERTAINMENT SOFTWARE** | | | |
| 218 | Uptime | Uptime | 19 |
| **HOME MANAGEMENT SOFTWARE** | | | |
| 218 | Uptime | Uptime | 19 |
| **FORM DESIGNERS** | | | |
| 174 | Analytx International Inc | Form Work | 401 |
| 249 | Reynolds & Reynolds | Custom Forms | 429 |
| **COMPATIBLE COMPUTERS** | | | |
| 499 | Jadine Research | 286 | 424 |
| **BACKUP SOFTWARE** | | | |
| 22S | Core International | Corefast | 111 |
| **DISK BACKUP & TAPE DRIVES** | | | |
| 232 | Cipher Data Products | Cipher 5400 | 175 |
| 194 | Everex Systems, Inc | Hard Disk Drives | 29-31 |
| 180 | Flagstaff Engineering | Tape | 426 |
| 237 | Tecmar Inc | Mass Storage/Disk Backup | 82 |
| 491 | J&M Systems | Disk Drives | 427 |
| **HARD DISKS** | | | |
| 194 | Everex Systems, Inc | Hard Disk Drives | 29-31 |
| 193 | Paul Mace Software | HD Dpbmizer | 426 |
| 539 | PC's Limited | Mass Storage Hardware | 8-11 |
| **COMPUTERS/COMPATIBLES** | | | |
| 507 | American Micro Technology | AMT JR, AM 386 | 304 |
| 327 | ARC | ARC PC | 236 |
| 359 | Bentley Computers | Compatibles, Mail Order | 80-81 |
| * | Compaq Computer Corp | Compatible | 188-189 |
| 227 | Compu Add | Compatibles, Mail Order | 250-253 |
| 163 | Computer Products United | PC Compatible | 400 |
| 194 | Everex Systems, Inc | Everex System 1800 | 29-31 |
| 255 | Great Western Electronics | Tandy Computers | 427 |
| 369 | Information & Technology Serv | ITS Turbo | 370 |
| 212 | Intelligent Microsystems | Compatibles, Mail Order | 384 |
| 536 | Laser Digital | Computer/AT Compatible | 274 |
| 234 | Northgate Computer Systems | Compatibles | 412-413 |
| 372 | PC Designs | 286 Micro | 323 |
| 325 | PC Discount | Noble Computer-XT,AT 386 | 76 |
| 483 | PC Engineering | Compatible | 202 |
| 539 | PC's Limited | PC's Limited Turbo PC, PC's Limited AT | 8-11 |
| 124 | Sears Robuck and Company | Business Systems | 71 |
| 135 | Tandon Corp | Tandon PC's | 345 |
| 299 | Tandy/Radio Shack | Compatible | 233 |
| 531 | Telex Computer Products | Telex Intelligent Workstation | 249 |
| * | Toshiba | T3100 Computer | 12-13 |
| 339 | United Solutions | Compatibles, Mail Order | 342 |
| 515 | Wells American | A Star | 5 |
| 121 | Value Plus | 386-AT | 18 |
| **INPUT DEVICES** | | | |
| 350 | Mouse Systems | The Mouse | 115-117 |
| 182 | Logictech | Logimouse | 299 |
| 140/141 | Data Desk International | Turbo 101 Enhanced Keyboard | 211 |
| **PROGRAMMERS TOOLS UTILITIES** | | | |
| | Central Point Software | Copy II PC | |
| 315 | Funk Software | Noteworthy | 139 |
| * | Microsoft | Quick Basic | 145-148 |
| * | Microway | 8087 Performance Upgrades | 360 |
| 159 | Microway | Smasher/ECM | 87 |
| 196 | Nantucket Corp | Clipper | 127 |
| 334 | Softlogic Solutions | Disk Optimizer | 165 |
| **MULTIFUNCTION BOARDS** | | | |
| * | AST Research | AT Memory Board | 2-3 |
| 146 | Data Copy | Microfax | 397 |
| 194 | Everex Systems, Inc | Multifunction Board | 29-31 |
| * | Microway | 8087 Performance Upgrades | 360 |
| 159 | Microway | Smasher/ECM | 87 |

| RS# | ADVERTISER | PRODUCT | PAGE# |
|---|---|---|---|
| 539 | PC e Limited | Multifunction Board | 8-11 |
| 106 | Zuckerboard-ATD | Zuckerboard | 328 |
| **ADD-ON BOARDS** | | | |
| 194 | Everex Systems, Inc | Add On Board | 29-31 |
| 511 | Intel | Above Board | 302-303 |
| * | Microway | 8087 Performance Upgrades | 360 |
| 159 | Microway | Smasher/ECM | 87 |
| 385 | PC Tech | Expanded Memory Board | 429 |
| 167 | Racore | PC Sr | 407 |
| 517 | STB Systems | Chauffeur HT | 109 |
| 276 | Hauppauge | Math Coprocessor | 32 |
| **SCANNERS/DIGITIZERS** | | | |
| 285 | Dest Corp | Scanner | 70 |
| 391 | Saba Tech | Hand Scanner | 96-97 |
| **PRINTERS** | | | |
| 242 | Alps America | Printer | 316-317 |
| 348 | CIE Terminale | Tri Printer | 271 |
| 277 | Tall Tree Systems | Laser Printer | 196 |
| 241 | Diconix | Printer | 256 |
| **PRINTER ACCESSORIES** | | | |
| 295 | Oresselhaus Computer Prod | Dots Perfect | 386 |
| 287 | Fifth Generation | Logical Connection | 292-293 |
| 493 | Integrated Marketing Corp | Printer Sharing Device | 321 |
| 190 | Quadram Corp | Micro Fazor B | 392 |
| 290 | Rose Electronics | Caretaker Plus CTP-SP/256, Masterswitch, Porter | 404 |
| **PORTABLE/LAP COMPUTERS** | | | |
| 284 | Quadram Corp | Datavue | 193 |
| **DISPLAYS & MONITORS** | | | |
| 539 | PC e Limited | Display/Monitors | 8-11 |
| 103 | Thomson Computer Products | Monitor | 125 |
| **GRAPHICS SOFTWARE** | | | |
| 201 | Haventree Software | Flow Charter | 380 |
| 367 | Banner Blue | Org | 387 |
| 386 | Foresight Resources Inc | Drafix | 340-341 |
| 379 | Polaris | Ram Resident | 373 |
| 523 | Rix Softworks Inc | EGA Paint | 133 |
| 487 | STSC, Inc | Statgraphics | 300 |
| 154 | Mathsoft | Math CAD | 42 |
| 107 | Research Group, The | "Say What" | 425 |
| **PLOTTERS/CHARTING DEVICES** | | | |
| 153 | Calcomp | Color Master | 376 |
| **VIDEO GRAPHICS/BOARDS** | | | |
| 540 | ATI Technologies Inc | EGA Wonder | 319 |
| 142 | Hercules Computer Technology | Graphica Board | 72-73 |
| 143 | Hercules Computer Technology | Hercules EGA | 395 |
| * | Peradise Systems | EGA Card | 131 |
| 118 | Tseng Labs Inc | EVA/480 | 266 |
| **ACCELERATOR BOARDS** | | | |
| 506 | Multitech | Bios (Accelerator) | 390 |
| 489 | Personal Computer Support | Breakthru 286, Breakthru Plus 296 Lightning | 157-159 |
| 532 | PMI | Accelerator Boards | 314 |
| 167 | Racore | PC Sr | 406 |
| **COMMUNICATIONS SOFTWARE** | | | |
| 226 | Compuserve Information Service | Software Information | 176 |
| 340 | Crosstalk Communications | Crosstalk Mark IV | 40-41 |
| 173 | EXD | PC Anywhere | 322 |
| 148 | Fastcom | dComlink | 374 |
| 223 | Intel-Pro | Pep | 308 |
| 290 | Rose Electronics | Masterswitch, Porter | 404 |
| 302 | MicroCom Systems | Public Domain and Multifunction Software | 21 |
| 131 | VM Personal Computing | The Relay Family | 173 |
| 494 | IDEAssociates | Communications | 122 |
| 371 | Lattice | Sidetalk | 310 |
| **LOCAL AREA NETWORKING** | | | |
| * | 3 COM | 3COM Token-Ring | 259 |
| 128 | Boeing Computer Sevices | Boeing Lan | 381 |
| 541 | DCA | Irma Lan | 206-207 |
| 287 | Fifth Generation | Logical Connection | 292-293 |
| 324 | Gateway Communications | Lans Hardware | 294 |
| 155 | Novell Inc | Netware | 268-269 |
| 492 | Orchid Technology | PC Net | 289 |
| 290 | Rose Electronics | Flashcom | 404 |
| 520 | Server Technology | Easy Lan | 357 |
| 314 | Simplenet | Mail Order Lan | 94 |
| 393 | Software Link, Inc | Lan Link | 171 |
| **MICRO-MAINFRAME LINKS** | | | |
| 287 | Fifth Generation | Logical Connection | 292-293 |
| 117 | Gateway Microsystems Inc | Sync-Link | 396 |
| 494 | IDEAssociates | Communications | 122 |
| 128 | INS | Gateway PC Adapter | 307 |
| **MODEMS** | | | |
| 386 | Microcom | Modem Card 19,200 BPS | 201 |
| 384 | Migent | Pocket Modem | 88-89 |
| 236 | Qubie | Modems | 282 |
| 112 | Telenetics | Modem | 166 |
| 185/186 | Touchbase Systems | Modem | 121 |
| 166 | U.S. Robotics Inc | Modem | 153 |
| 364 | Ven-Tel | Modems | 14 |
| 494 | IDEAssociates | Communications | 122 |

| RS# | ADVERTISER | PRODUCT | PAGE# |
|---|---|---|---|
| **EMULATORS/PROTOCOL CONVERTERS** | | | |
| 215 | CXI | Emulation Equipment | 272 |
| 223 | Intel-Pro | PEP | 308 |
| * | Microway | 8087 Performance Upgrades | 360 |
| 159 | Microway | Smasher/ECM | 87 |
| 365 | Persoft | Terminal Emulation | 58 |
| 139 | Polygon Software | Emulation Software | 39 |
| **MULTIUSER SYSTEMS** | | | |
| 253 | Our Business Machine | Multi User System | 402 |
| 531 | Telex Computer Products | Telex Intelligent Workstation | 249 |
| 280 | Digital Products | Net Commander | 378 |
| **POWER PROTECTION** | | | |
| 272 | Kensington Microware Ltd | Masterpiece & Masterpiece Plus | 79 |
| 161 | Perma Power Electronics | Power Regulation | 315 |
| **SECURITY** | | | |
| 301 | United Software Security | On Guard | 92 |
| **PC ACCESSORIES** | | | |
| * | Curtis Manufacturing | Curtis Manufacturing Accessories | C6 |
| 287 | Fifth Generation | Logical Connection | 292-293 |
| 269 | International Battery Corp | AT Replacement Batteryy | 313 |
| 390 | Microsync Computer Products | dCLOCK II | 349 |
| **MAIL ORDER** | | | |
| * | Arlington Computer Products | Mail Order | 420-421 |
| * | Bay Express | Mail Order | 422 |
| 314 | Simplenet | Mail Order | 94 |
| 357 | Advancedware | Mail Order | 364 |
| 206 | Telemart | Mail Order | 84-85 |
| 123 | Silicon Specialties | Mail Order | 62 |
| 179 | American Software House | Mail Order | 359 |
| * | PC Connection | Mail Order | 226-229 |
| * | MICROBEST | Mail Order | 410 |
| * | Business Computers of Peterborough | Mail Order | 346-347 |
| 297 | Computer Classified | Mail Order | 418 |
| 216 | California Digital | Mail Order | 414 |
| 359 | Bentley Computers | Compatibles, Mail Order | 80-81 |
| 481 | Bull Dog Computer Products | Computers & Accessories | 362-363 |
| 270 | Chicago Computer Connection | Mail Order | 419 |
| 227 | Compu Add | Compatibles, Mail Order | 250-253 |
| 109 | Computer Discount Warehouse | Mail Order | 415 |
| 183 | Computer Mailorder | Mail Order | 382-383 |
| 266 | General Technology Corp | Mail Order | 394 |
| 212 | Intelligent Microsystems | Compatibles, Mail Order | 384 |
| 243 | Jade Computer Products | Mail Order | 417 |
| 133 | JOR Micro Devices | Mail Order | 411 |
| 400 | Logicsoft | Mail Order | 213-218 |
| 375 | Master Technologies | Mail Order | 418 |
| 387 | MHI Warehouse | Mail Order | 418 |
| 524-525 | Moneysworth Computer Products | Mail Order | 68-69 |
| 234 | Northgate Computer Systems | Mail Order | 412-413 |
| 150 | PC American | Mail Order | 379 |
| 310 | PC Brand | Mail Order | 22-25 |
| 144 | PC Brand | Mail Order | 60 |
| 171 | Warehouse Data Products | Mail Order | 355 |
| 496 | PC Mart | Computer & Accessories | 181 |
| 535 | PC Network | Mail Order | 284-287 |
| 539 | PC e Limited | Mail Order | 8-11 |
| 101 | Softline | Mail Order | 90 |
| 471 | Software Express Direct | Software Express Direct | 78 |
| 322 | Technoland | Mail Order | 398 |
| 339 | United Solutions | Compatibles, Mail Order | 342 |
| **ON LINE DATABASES** | | | |
| 331 | Dialog Information Services | Database | 281 |
| * | Dow Jones News/Retrieval | Dow Jones News On Line DB | 247 |
| 247 | GEISCO | Genie | 241 |
| **ORGANIZATIONS/SERVICES** | | | |
| 218 | Uptime | Uptime | 18 |
| **MISCELLANEOUS** | | | |
| 224 | Computer Inc | Compututor | 429 |
| **DIRECT MARKETING CONNECTION** | | | |
| * | Arlington Computer Products | Mail Order | 420-421 |
| * | Bay Express | Mail Order | 422 |
| 216 | California Digital | Mail Order | 414 |
| 270 | Chicago Computer Connection | Mail Order | 419 |
| 297 | Computer Classifieds | Mail Order | 416 |
| 109 | Computer Discount Warehouse | Mail Order | 415 |
| 243 | Jade Computer Products | Mail Order | 417 |
| 133 | JOR Micro Devices | Mail Order | 411 |
| 375 | Master Technologies | Mail Order | 418 |
| 387 | MHI Warehouse | Mail Order | 418 |
| * | MICROBEST | Mail Order | 410 |
| 234 | Northgate Computer Systems | Mail Order | 412-413 |
| **MARKETPLACE** | | | |
| 341 | Bible Research Systems | The Word Processor | 428 |
| 130 | Challenge Software | Accounting Software & Database | 424 |
| 224 | Computer Inc | Compututor | 429 |
| 180 | Flagstaff Engineering | Tape | 426 |
| 132 | Glenco Engineering | Programming Software | 428 |
| 255 | Great Western Electronics | Tandy Computers | 427 |
| 385 | PC Tech | Expanded Memory Board | 429 |
| 107 | Research Group, The | "Say What" | 425 |
| 248 | Reynolds & Reynolds Co. | Custom Forms | 429 |

PC MAGAZINE

# EDITORIAL PRODUCT INDEX

| READER SERVICE NUMBER | PRODUCT | COMPANY | PAGE |
|---|---|---|---|
| **ADD-IN BOARDS** | | | |
| 429 | Above Board 286 | Intel | 45 |
| 429 | Above Board PS/286 | Intel | 45 |
| 423 | AutoSwitch EGA 480 Card | Paradise Systems | 43 |
| **BACKUP** | | | |
| 436 | Emerald ODS-2010 Cassette Tape Backup | Emerald Systems | 38 |
| **COMPUTERS** | | | |
| 427 | GRiDlite | GRiD Systems | 48 |
| **DATABASE MANAGEMENT** | | | |
| 422 | dBXL | WordTech Systems | 46 |
| **GRAPHICS** | | | |
| 431 | Pepper SGT | Number Nine Computer | 44 |
| **HARDWARE** | | | |
| 430 | Personel Data Pac | Tandon | 45 |
| 433 | ThinWin | Axonix | 44 |
| **LANGUAGES** | | | |
| 425 | Bas2Pas | Gotoless Conversions | 43 |
| 424 | GSI Pascal | GSI Transcomm | 38 |
| 435 | QuickBASIC 3.0 | Microsoft | 33 |
| **MODEMS** | | | |
| 647 | Amazing Things Model A Series 1200B | Amazing Things Inc | 118 |
| 646 | Amazing Things Model A Series 2400B | Amazing Things Inc | 116 |
| 642 | AT&T Model 4000 | AT&T Information Systems | 119 |
| 641 | AT&T Model 4112 | AT&T Information Systems | 119 |
| 643 | AT&T Model 4024 | AT&T Information Systems | 119 |
| 662 | Basic Time PC212A/1200 | Basic Time Inc | 123 |
| 621 | Basic Time 212A/1200E | Basic Time Inc | 123 |
| 619 | Basic Time 2400E | Basic Time Inc | 123 |
| 620 | Basic Time 2400I | Basic Time Inc | 123 |
| 617 | Black Box Dial Modem 24 Plus | Black Box Corp | 126 |
| 618 | Black Box Half-Card Modem 2400 | Black Box Corp | 126 |
| 542 | Bytcom 24/12 ADH | Bytcom Inc | 129 |
| 668 | Cermetek Security Modem | Cermetek Microelectronics Inc | 129 |
| 669 | Cermetek 2400SPC | Cermetek Microelectronics Inc | 175 |
| 543 | Code-A-Phone Tel-A-Modem | Code-A-Phone Corp | 132 |
| 467 | Commodore Amiga Modem/1200 RS | Commodorn Business Machines Inc | 136 |
| B79 | Dowty Quattro V 22bis International Modem | Dowty Information Systems | 138 |
| B14 | EMP Automodem 1200HC | EMP Memory Products | 140 |
| 653 | Fastcomm 2496T | Fastcomm Data Corp | 140 |
| 652 | Fastcomm 2496T-B | Fastcomm Data Corp | 140 |
| 645 | Franklin FM-2400E | Franklin Telecommunication Corp | 143 |
| B12 | Fujitsu M19350 | Fugitsu America Inc | 144 |
| 634 | Gandalf Data Access Series SAM 24S | Gandalf Data Inc | 144 |
| 644 | General DataComm Acculine 224 | General DataComm Inc | 149 |
| 698 | Hayes Smartmodem 1200 | Hayes Microcomputer Products Inc | 150 |
| 697 | Hayes Smartmodem 1200B | Hayes Microcomputer Products Inc | 150 |
| 696 | Hayes Smartmodem 2400 | Hayes Microcomputer Products Inc | 150 |
| 695 | Hayes Smartmodem 2400B | Hayes Microcomputer Products Inc | 150 |
| 460 | IBM 2400-bps Internal Modem | IBM Corp | 154 |
| 461 | IBM 5842 Modem | IBM Corp | 154 |
| 699 | IOEAcomm 2400 | IOEAssociates Inc | 155 |
| 685 | Kyocera KM12000 | Kyocera International Inc | 156 |
| 686 | Kyocera KM1200S | Kyocera International Inc. | 156 |
| 468 | Leading Edge Model L Series 1200B | Leading Edge Products Inc | 160 |
| 465 | Leading Edge Model L Series 2400B | Leading Edge Products Inc | 160 |
| 462 | Migent Pocket Modem | Migent Inc | 181 |
| 694 | Multi-Tech MultiModem224E | Multi-Tech Systems Inc | 162 |
| 693 | Multi-Tech MultiModem224EC | Multi-Tech Systems Inc | 162 |
| 613 | Natural Microsystems Watson | Natural Microsystems Corp | 167 |
| 673 | Novation 1200 XE | Novation Inc | 168 |
| 672 | Novation 1200 XE Half Card | Novation Inc. | 168 |
| 671 | Novation 2400 Professional | Novation Inc | 168 |
| 670 | Novation 2400 Professional Half Card | Novation Inc | 168 |
| 650 | OmniTel Encora 1200HB | OmniTel Inc | 170 |
| 651 | OmniTel Encora 1200LC | OmniTel Inc | 170 |
| 649 | OmniTel Encora 2400HB | OmniTel Inc | 170 |
| 648 | OmniTel OmniPak | OmniTel Inc | 170 |
| 631 | PC's Limited PC 2400 B | PC's Limited | 177 |
| 640 | Penril Cadet 1200 | Penril Datacomm | 178 |
| 639 | Penril Cadet 2400 | Penril Datacomm | 178 |
| 638 | Penril Datalink 2400 | Penril Datacomm | 178 |
| 636 | Prentice PopCom C150 | Prentice Corp | 192 |
| 635 | Prentice PopCom C250 | Prentice Corp | 192 |
| 637 | Prentice PopCom X150 | Prentice Corp | 192 |
| 678 | Prometheus ProModem 1200 | Prometheus Products Inc | 197 |
| 676 | Prometheus ProModem 1200B/2 | Prometheus Products Inc | 197 |
| 677 | Prometheus ProModem 1200G | Prometheus Products Inc | 197 |
| 675 | Prometheus ProModem 2400 | Prometheus Products Inc | 197 |
| 674 | Prometheus ProModem 2400G | Prometheus Products Inc | 197 |
| 610 | Quadram Quadmodem QM2000 | Quadram Technologies Inc | 200 |
| 609 | Quadram Quadmodem QM2024 | Quadram Technologies Inc | 200 |
| 688 | Racal-Vadic Maxwell 2400VP | Racal-Vadic Inc | 203 |
| 687 | Racal-Vadic 2400PA | Racal-Vadic Inc | 203 |
| 684 | SmarTEAM 1200AT | SmarTEAM Inc | 205 |
| 683 | SmarTEAM 2400 | SmarTEAM Inc | 205 |
| 682 | SmarTEAM 2400B | SmarTEAM Inc | 205 |
| 464 | Tek-Com-212AD | Tek-Com Corp | 209 |
| 457 | Telenetics ExpressData 12i/2 | Telenetics Corp | 209 |
| 456 | Telenetics ExpressData 24i/2 | Telenetics Corp | 209 |
| 455 | Telenetics ExpressData 24s | Telenetics Corp. | 209 |
| 459 | Telenetics PonyExpress 12a | Telenetics Corp | 209 |
| 458 | Telenetics PonyExpress 24a | Telenetics Corp | 209 |
| 633 | THE 1200 Com Modem | Thompson, Harriman and Edwards Computer Products Ltd | 219 |
| 632 | THE 2400 Com Modem | Thompson, Harriman and Edwards Computer Products Ltd | 219 |
| 681 | Transend PCM1200 | Transend Corp | 220 |
| 680 | Transend PCM2400 | Transend Corp. | 220 |
| 616 | U.S. Robotics Courier 1200 | U.S. Robotics Inc | 222 |
| 615 | U.S. Robotics Courier 2400 | U.S. Robotics Inc | 222 |
| 611 | USTR Smartmodem 1200B | U.S. Trade Research | 223 |
| 690 | Ven-Tel Half-Card 24 | Ven-Tel Inc | 224 |
| 692 | Ven-Tel PC Modem Half-Card | Ven-Tel Inc | 224 |
| 691 | Ven-Tel 1200 Plus | Ven-Tel Inc | 224 |
| 689 | Ven-Tel 2400 Plus | Ven-Tel Inc | 224 |
| 463 | Visionary 1200 | Visionary 1200 | 230 |
| 544 | Worthington-Babcock Turbolink 1200 | Worthington-Babcock Inc | 463 |
| 468 | Zoom Modem 1200 ST | Zoom Telephonics Inc | 232 |
| 469 | Zoom Modem 2400 ST | Zoom Telephonics Inc | 232 |
| **PRINTERS** | | | |
| 432 | LaserPro Express | Office Automation Systems | 44 |
| 432 | LaserPro Silver Express | Office Automation Systems | 44 |
| 432 | LaserPro Gold Express | Office Automation Systems | 44 |
| **SERVICES** | | | |
| 664 | AT&T Mail | AT&T Information Systems | 276 |
| 606 | BRS/After Dark | BRS Information Technologies | 240 |
| 606 | BRS/Brkthru | BRS Information Technologies | 240 |
| 606 | BRS/Search Service | BRS Information Technologies | 240 |
| 605 | CompuServe | Compuserve | 240 |
| 604 | Delphi | General Videotext Corp | 240 |
| 603 | Dialcom | Dialcom Inc | 242 |
| 602 | Dialog | Dialog Information Services Inc | 246 |

| READER SERVICE NUMBER | PRODUCT | COMPANY | PAGE |
|---|---|---|---|
| 601 | Dow Jones News/ Retrieval | Dow Jones & Co | 248 |
| 662 | EasyLink | Western Union Telegraph Co. | 276 |
| 550 | GEnie | General Electric Information Services Co | 248 |
| 549 | Infomaster | Western Union Telegraph Co. | 248 |
| 659 | Mail | Dialcom Inc | 296 |
| 660 | MCI Mail | MCI | 276 |
| 648 | NewsNet | NewsNet | 257 |
| 658 | Notice | Computer Sciences Corp. | 246 |
| 657 | OnTyme | McDonnell Douglas | 297 |
| 656 | The Quik-Comm System | General Electric Information Services Co | 298 |
| 655 | RCA Mail | RCA Global Communications Inc | 301 |
| 547 | The Source | Source Telecomputing Corp. | 257 |
| 654 | Telemail | GTE Telenet Communications Corp | 301 |
| 546 | Vu/Text | Vu/Text Information Services Inc | 258 |
| 545 | Wilsonline | H W Wilson Co | 258 |

**SOFTWARE**

| READER SERVICE NUMBER | PRODUCT | COMPANY | PAGE |
|---|---|---|---|
| 451 | Alexander-Plus Data II | Omzig Inc. | 306 |
| 630 | Ascom IV | Dynamic Microprocessor Assoc. Inc | 234 |
| 663 | AT&T Mail Access I | AT&T Information Systems | 276 |
| 663 | AT&T Mail Access II | AT&T Information Systems | 276 |
| 608 | AUTOSIG (ATO) | | 254 |
| 453 | BackComm | LaSalle Micro Inc. | 314 |
| 428 | Bookshelf | Microsoft | 44 |
| 629 | Crosstalk XVI | Microstuf Inc | 234 |
| 628 | Hyper Access | Hilgraeve Inc | 234 |
| 661 | Instant Forms Plus | Western Union Telegraph Co | 276 |
| 661 | Instant Mail Manager | Western Union Telegraph Co. | 276 |
| 661 | Instant Mail Manager | Western Union Telegraph Co. | 276 |
| 627 | Microsoft Access | Microsoft Corp | 234 |
| 626 | PC-Talk III | The Headlands Press Inc | 234 |
| 625 | ProComm | PIL Software | 234 |
| 667 | Pro-Search | Personal Bibliographic Software Co. | 265 |
| 452 | Relay Gold and Relay Silver | VM Personal Computing Inc | 320 |
| 624 | Relay Gold and Relay Silver | VM Personal Computing | 235 |
| 665 | Sci-Mate Searcher | Institute for Scientific Information | 267 |
| 666 | Search Helper | Information Access Co | 270 |
| 454 | SideTalk | Lattice Inc. | 322 |
| 623 | Smartcom II | Hayes Microcomputer Products Inc. | 235 |
| 607 | ZAPCIS | Omni Information Resources | 254 |

**SPREADSHEET ANALYSIS**

| READER SERVICE NUMBER | PRODUCT | COMPANY | PAGE |
|---|---|---|---|
| 440 | 4Word | Turner Hall Publishing | 33 |

**UTILITIES**

| READER SERVICE NUMBER | PRODUCT | COMPANY | PAGE |
|---|---|---|---|
| 426 | Dragnet | Access Softek | 36 |
| 438 | Jot! | Beacon Software International | 51 |
| 439 | Rescue | Polaris Software | 51 |
| 437 | Unit*Assistant | Thermal Systems Analysis | 51 |
| 421 | VOPT | Golden Bow Systems | 36 |

**PRODUCTIVITY**

| DEPARTMENT | PROGRAM NAME/DESCRIPTION | PAGE |
|---|---|---|
| Connectivity Clinic | Bridging IBM Token-Ring and PC LAN with EtherLink and Advanced Netware. | 377 |
| Connectivity Clinic | Compatibility of Novell, IBM, and 3Com networks with high-speed servers. | 377 |
| Connectivity Clinic | Definition of TCP/IP compatibility, used in Novell LAN advertisements. | 377 |
| Connectivity Clinic | Fox Research's 10-NET provides excellent printer spooling and security. | 378 |
| Connectivity Clinic | Using Innovative Software's LAN Performance Test for network specs. | 378 |
| PC Lab Notes | Turbo BASIC adds new capabilities to charge up an old language. | 331 |
| PC Tutor | EgaBsave and EgaBload save and load EGA graphics in QuickBASIC 2.0. | 403 |
| PC Tutor | Lower the PC speaker's volume by muffling it or connecting a resistor. | 406 |
| PC Tutor | PRNSWAP.COM switches between two printers connected to the same PC. | 404 |
| PC Tutor | Within expansion slot J8, only use boards specifically designed for it. | 406 |
| Spreadsheet Clinic | 1-2-3, Release 1A, method for hiding formulas reformats them as text. | 372 |
| Spreadsheet Clinic | Ruler shows width of 1-2-3 print range. | 371 |
| Spreadsheet Clinic | Unsupervised sequential printing of Symphony files. | 372 |
| Spreadsheet Clinic | To speed 1-2-3 cell copying, name source ranges, delete old range names. | 372 |
| Spreadsheet Clinic | Techniques for embedding printer setup strings in 1-2-3 worksheets. | 371 |
| Programming | ORAW lets you create pictures and graphics without programming in BASIC. | 334 |
| Turbo Power User | BASOATA.PAS, PASOATA.PAS make BASIC and Turbo programs for .COM files. | 386 |
| Turbo Power User | FREE_SPACE_DEMO measures the number of bytes left on a disk. | 385 |
| Turbo Power User | Procedures for sending output to the device of your choice. | 385 |
| User-to-User | EAT.SCR sets up memory to see how programs work on smaller machines | 396 |
| User-to-User | PARTLOAD.BAS creates fast split-screen slide shows. | 396 |
| User-to-User | UPPER.COM and LOWER.COM convert text files to all upper- or lowercase. | 393 |
| User-to-User | WIPEOUT.BAS may help permanently wipe out deleted files. | 399 |

# COMING UP

**DISKLESS WORKSTATIONS** The new kid on the LAN circuit is the diskless workstation. These compact systems are quieter and cooler and cost less than a standard PC. And because they have no disk drives, they improve network security since you can't copy programs or data onto floppy disks. Frank J. Derfler, Jr., reviews and benchmark-tests six LAN stations.

**"LOOK AND FEEL" LAWSUIT** The entire computer industry is abuzz with speculation about Lotus's pending lawsuits against Mosaic Software and Paperback Software International, makers of two *1-2-3* clones, *The Twin* and *VP-Planner*. The outcome of the suits could radically change the products you'll be able to buy in the future; hence *PC Magazine* is stepping out of character to provide in-depth coverage of the case and the issues surrounding it. How might the suit affect the direction of copyright laws for computer products? When does following an industry standard become plagiarism? And what will this suit mean to the advancement of an industry that depends on incremental changes rather than major-league breakthroughs? We'll also give you an opportunity to voice your opinions by responding to our reader questionnaire.

**NEWVIEWS** *NewViews* breaks out of the traditional accounting software mold by taking ideas from databases, spreadsheets, and word processors and melding them into a new, flexible program. Find out if this new view of an accounting program meets your needs.

**PCs AS FAX MACHINES** Fax, or facsimile transmission, has been available for PCs for a number of years, but lately the number of emerging products has hit critical mass. Winn L. Rosch explains the complexities of the technology and reports on the first wave of products.

**FOUR-FIGURE VIDEO** Today, high-resolution graphics means video boards and displays in which horizontal or vertical resolution is 1,000 pixels or more. Charles Petzold reviews nine products. PC

# The Most Powerful Business Software Ever Has Just Become Even More Powerful!

FOR YOUR IBM PC/XT/AT, TANDY, COMPAQ, AT&T OR OTHER IBM COMPATIBLE COMPUTER

**OVER 100,000 SOLD**

## The VERSABUSINESS™ Series

Each VersaBusiness module can be purchased and used independently, or can be linked in any combination to form a complete, coordinated business system.

**VERSALEDGER-II™** $149.95
is a complete accounting system that grows as your business grows. VERSALEDGER-II can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system without any additional software

**VERSARECEIVABLES™** $99.95
is a complete menu-driven accounts receivables, invoicing, and monthly statement generating system that keeps track of all information related to who owes you or your company money

**VERSAPAYABLES™** $99.95
is designed to keep track of all current and aged payables keeping you in touch with all information related to how much money your company owes and helping to manage your cash flow

**VERSAPAYROLL™** $99.95
is the most powerful fully automated payroll system available, yet easy to use. Keeps track of all government-required payroll information, instantly calculates payroll deductions (in every state) and prints checks and related forms

**VERSAINVENTORY™** $99.95
is an instant access inventory program that gives you virtually unlimited storage capacity and the comprehensive statistics required to make all of your vital inventory decisions

**REVIEWS:**
Distribution of the VersaSeries has now exceeded 100,000 making the VersaSeries the largest mass distributed accounting software package in the world. Among recent reviews, the VarsaSeries received an excellent rating in the new Addison-Wesley rating encyclopedia. The VersaSeries actually outperformed competitive packages selling at three to five times the price

COMPUTRONICS
24 HOUR TOLL FREE ORDER LINES
1-800-431-2818 1-800-331-0362
30-DAY MONEY BACK GUARANTEE

# Lotus™ 1-2-3™ Symphony™

READY-TO-RUN APPLICATIONS PACKAGES FOR LOTUS® 1-2-3™ AND SYMPHONY™

### THE COMPLETE BUSINESS PAC

The five essential modules for all small businesses
- GENERAL LEDGER
- PAYROLL
- ACCOUNTS RECEIVABLE
- ACCOUNTS PAYABLE
- INVENTORY CONTROL

The Complete Business Pac . . . . . $99.95

### PERSONAL/BUSINESS PAC

Contains all the essentials for business, home or personal use
- CHECK REGISTER CONTROL
- TELEPHONE DIRECTORY
- MAILING LIST MANAGER
- THE BUSINESS/HOME ACCOUNTANT
- CREDIT CARD MANAGER
- BANK ACCOUNT MANAGER

Personal/Business Pac . . . . . $99.95

### STOCK PAC

All the major functions for evaluation, selection and management of your investment portfolio
- PORTFOLIO VALUATION
- BOND CALCULATIONS
- FUTURE PRICE PROJECTIONS
- FINANCIAL RATIOS
- STOCK MARKET ANALYSIS
- CASH MARKET FORECASTING

Stock Pac . . . . . $99.95

### LOAN APPLICATION PAC

Calculates and prints all interest, mortgage and savings calculations
- LOAN AMORTIZATION SCHEDULE
- MORTGAGE/REAL ESTATE CALCULATION
- CASH FLOW ANALYSIS
- PRESENT/FUTURE PAYMENT
- INVESTMENT ANALYSIS
- LEASING

Loan Application Pac . . . . . $99.95

### BUDGET ANALYSIS PAC

For accountants, investors and small businesses that want to present professional statements to their clients
- BALANCE SHEET PREPARATION
- COMPARATIVE INCOME STATEMENTS
- FINANCIAL RATIOS
- CASH FLOW ANALYSIS

Budget Analysis Pac . . . . . $99.95

### DEPRECIATION PAC

Performs all standard IRS-accepted depreciation calculations and prints professional reports.
- DEPRECIATION ACCELERATED COST RECOVERY SYSTEM
- STRAIGHT LINE DEPRECIATION
- SUM OF THE YEAR'S DIGITS
- DOUBLE DECLINING BALANCE

Depreciation Pac . . . . . $99.95

*Each of these Lotus 1-2-3/Symphony add-on packages comes on an unprotected diskette. The user may modify any add-on package for his own needs. Each package can be used with or without a printer. When used with a printer, the user is provided with professional looking printouts which can be customized to meet the needs of the user. A manual accompanies each package.* 1-2-3 and Symphony are trademarks of Lotus Development Corp. Lotus® is a registered trademark of Lotus Development Corp

COMPUTRONICS
24 HOUR TOLL FREE ORDER LINES
1-800-431-2818 1-800-331-0362
30-DAY MONEY BACK GUARANTEE

# Professional Time and Billing System

INSTANT BUSINESS™

**For ATTORNEYS, ACCOUNTANTS, ARCHITECTS, CONSULTANTS, DOCTORS and Anyone Who Bills for Time or Service**

**Dramatic Breakthrough for Any Professional Who Bills for Time or Service. This New User-Friendly Package Will Outperform Your Present Time and Billing System.**

Save Time and Money. Your INSTANT BUSINESS Professional Time and Billing System takes over your routine Billing and Management Chores
- Automates your billing
- Bills by time and/or service
- Keeps track of both billable and non-billable time
- May be used by an individual or by a multi-employee professional practice
- Keeps a computerized customer file with both historical and current billing information
- Use the built in Accounts Receivable module to keep track of all money due
- The employee file contains basic information pertaining to each of your employees
- A payment file contains a complete record of all payments and adjustments
- Includes flexible invoices, statements and reports
- Supports up to 999 service codes
- You may bill your clients either by the hour or by the service rendered making the system an excellent package for any professional who must bill for time or specific services
- Requires 2 floppy disk drives or a hard disk drive system. Capacity is only limited by disk drive size

**$295.**
FOR YOUR IBM PC/XT/AT, TANDY, COMPAQ, AT&T, or other IBM Compatible Computer

COMPUTRONICS
24 HOUR TOLL FREE ORDER LINES
1-800-431-2818 1-800-331-0362
30-DAY MONEY BACK GUARANTEE

INSTANT BUSINESS™

# PROPERTY MANAGEMENT SYSTEM

THIS EASY TO USE PROPERTY MANAGEMENT AND ACCOUNTING SYSTEM is ideal for anyone who needs to keep track of rental income and expenses.

This system performs all bookkeeping activities associated with owning small or large apartment buildings, commercial office buildings, warehouses, retail stores, single-family homes, co-ops or condominiums, recreational vehicles, personal property storage facilities or any other similar rental properties.

**EASY TO UNDERSTAND**
The INSTANT BUSINESS PROPERTY MANAGEMENT SYSTEM is designed to save time and money. The comprehensive user's manual gives step-by-step instructions with detailed reproductions of screen displays and sample reports. The on-line help instructions and easy to follow menus will quickly eliminate the need to refer to the manual

**CHECK REGISTER ACCOUNTING SYSTEM**
Print checks and keep detailed information related to any checks that must be written. Flexible accounts allow for customization of your system. The CHECK REGISTER ACCOUNTING SYSTEM also keeps track of all cash disbursements

**SAVE TIME AND MONEY**
This system is designed to save time and money. The goal of INSTANT PROPERTY MANAGEMENT is to automate your accounting and management of properties in a fast and economical way. The system is flexible so that you can pick and choose only those options that apply to your needs.

Save time and money by issuing COMPUTERIZED STATEMENTS and COLLECTION NOTICES. Your timely, accurate and professional statements and collection notices will speed up collections and spot potential losses early enough to take corrective action

**INSTANT STATUS QUERIES**
At the touch of a button, see the current status of any property, rental unit or tenant. A memo file allows the recording of notes such as damages, noise complaints, etc

**COMPLETE TRANSACTION BOOKKEEPING**
Record complete transaction history for residential and/or commercial property related charges, deposits, payments, refunds, write-offs, etc. Automatically posts standard monthly rents for easy entry and computes common area assessments and percentage leases.

**INSTANT PROPERTY MANAGEMENT SYSTEM REPORTS**
- PROPERTY [illegible]
- RENTAL UNIT [illegible]
- TENANT INFORMATION
- LEASE REPORTS
- VACANCY [illegible]
- ACTION/DATE REPORTS
- DATE RENT REPORTS
- INCOME AND EXPENSE REPORTS
- SUMMARY [illegible] REPORTS
- TENANT ACTIVITY REPORTS
- ACCOUNTS RECEIVABLE AGING REPORTS
- STATEMENT GENERATION
- MAILING LABELS

**PROPERTY MANAGEMENT FEATURES**
- PROPERTY FILE MAINTENANCE
- RENTAL UNIT FILE MAINTENANCE
- TENANT FILE MAINTENANCE
- LEASE FILE MAINTENANCE
- AUTOMATIC BILLING
- [illegible]-TIMED DETAILS
- TRANSACTIONS PICKS SYSTEM
- COURTESY TENANT ACTIVITY
- [illegible] GENERATION
- END OF PERIOD PROCESSING

**$495.** FOR YOUR IBM PC/XT/AT, TANDY, COMPAQ, AT&T, or other IBM Compatible Computer

COMPUTRONICS
24 HOUR TOLL FREE ORDER LINES
1-800-431-2818 1-800-331-0362
30-DAY MONEY BACK GUARANTEE

CIRCLE 260 ON READER SERVICE CARD